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The Edward Stirling Lectures.[1]

LECTURE I: THE GROWING EDGE.

By JOHN LOEWENTHAL,

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To be allowed to help you pay your annual homage to a great man is an honour indeed, and from my reading of his life, I can see that Sir Edward Stirling was truly a very great man. Many of you will have grown up in the long shadow cast by him and perhaps some here tonight will have known him personally. I will not therefore reiterate the details of his distinguished life. This has been done before and will no doubt be done again. Rather do I prefer to examine that quality of his which to me is the most important and significant of his manifest virtues and which, perhaps, merits our attention most of all—his scholarship.

Oliver Wendell Holmes assured us that "the world's great men have not been great scholars nor its great scholars great men", but Stirling was the exception to this. Of his greatness there can be no doubt. Not only did he interest himself in an amazing and almost bewildering diversity of subjects, but apparently he did so with outstanding success in most of them. Of all these interests the one which perhaps stamps him most clearly as a great man is his interest in and impact on this fine Adelaide School of Medicine. His contribution here has clearly been of great significance and importance and the results of this powerful influence can be traced over a wide area. A direct and important link exists with our own school in Sydney in the person of our Chancellor, Sir Charles Blackburn, whose preclinical training was completed here, and who would have graduated from Adelaide had it not been for that celebrated and unfortunate contretemps about the matron of the Royal Adelaide Hospital. If anyone here has any doubts about Sir Charles's present importance, I suggest that he should listen to one of his occasional addresses at a graduation ceremony or even—if he is foolish or intemperate enough—to put before him for his critical appraisal something which is either unwise in concept or improper in principle. His penetrating wisdom and clarity of vision have been an object lesson to some of us younger men, who have had the privilege of seeing it at close quarters and have benefited from it repeatedly. For those with eyes to see, there are many lessons to be learned in this way, and it is well within the bounds of probability that a direct and cogent link exists between Edward Stirling through Charles Blackburn to us this evening. Indeed, if we think of the important role our Australian univer-

[1] Delivered in Adelaide on May 30, 1961.

sities have played in a community which has essentially been a small and detached one, we should be especially grateful for men like Stirling. He flourished in the calm of the late Victorian and the Edwardian years; the mill-pond of university life was placid and the growth of knowledge was comparatively orderly. The ripples that spread from the Stirlings of those years travelled far, and were subjected to few other contradictory waves. Nowadays, it is changed a little; more outside influence is apparent and there is more turbulence on the surface, but in spite of everything we are still physically semi-detached from the rest of the western world, and it is a sobering thought to those of us engaged in teaching the young that our ripples also spread far and wide, that our influence for good or ill is still a powerful one and that the responsibility is essentially no less than it was in Stirling's day.

That Stirling was a great man can therefore be accepted without reservation, and there is little difficulty in establishing that he was also a scholar. The mere recital of the astonishing range of his interests determines his claim to true scholarship—surgery, anatomy, physiology, art, natural history, ethnology, palæontology and political economy—what a spread of interest and endeavour! And he received that most coveted and most ancient of all scientific awards—the Fellowship of the Royal Society of London.

Dr. J. C. Verco recorded in 1919 how, in 1889, at the university commemoration, Dr. Stirling gave the oration on "The Aims and Methods of Biological Science", and in the January number of the *Australasian Medical Gazette* in 1890 appeared an editorial from which I quote: "Dr. Stirling's thoughtful, scholarly, and indeed masterful address deserves a far wider circle of hearers than those who had the pleasure of listening to it."

That he was a scholar is therefore also readily established. But what, we may ask, does it mean to be a scholar? We are prone, in these hurried and turbulent days, to use a term such as this without thought or care, and having used it, to feel that its very use has achieved something. Indeed, so common is the practice that ours may one day be stigmatized as the "age of the facile label". In our ordinary living we are so much the prey of the modern media of mass indoctrination—the tabloid newspaper, the radio, the films and the television—that we accept their slick labels and use them gratefully because they save us the necessity of thinking. This is not our immediate concern tonight, but what is very much to the point is that we should recognize the grave danger that comes from letting this practice creep into our medicine. Our students and young graduates, we find, tend more and more to use an easy label with the triumphant air of the conjurer who successfully produces a rabbit out of a top hat, as though it was an end in itself, explaining everything and absolving him entirely from any further intellectual effort. It is so frequently no more than an expedient cloak for ignorance that it is surely the very antithesis of scholarship, and the negation of those principles for which we believe Stirling stood.

If I were to try to define a scholar, it would be "one who is not so much concerned with the length and breadth of knowledge as with its depth".

Sir Edward Stirling was, in these terms, a scholar. And I suggest to you that the real casualty of our overcrowded universities, with their over-stressed faculties, their preoccupation with technologies and degrees and their hurried *tempo* of existence, is scholarship. This is the priceless treasure of our learning, the only thing that survived from the ancient civilizations as they successively blossomed, faded and disappeared, to be built on and added to in succeeding ages, so that we now have it as a bountiful heritage. It should live, serene and splendid, in our seats of learning, and in these our years, it is in jeopardy. Therefore, let us clearly recognize the essential quality of the man we are here to honour tonight and not content ourselves with lip service to his ideals, but rather dedicate ourselves to maintain his standards of scholarship and knowledge. For, if we do not, whom else can we expect to do it for us?

Sir Edward Stirling died 42 years ago. Since then great and strange changes have taken place, and our knowledge of the earth and of our environment has increased with startling rapidity. Science has bestowed on us the doubtful blessing of vast new sources, not only of power, but also of destruction, and has showered us with a deluge of factual information that sometimes leaves us ordinary folk gasping and bewildered. Philosophy for long evolved as history quietly unfolded, and the philosopher and historian could indicate to us whence we had come, the path we were treading and the general direction of our future; but in present times, history is being made so fast and such fundamental and significant changes can occur in so few fleeting moments that its lessons are no longer clear and our philosophy is out of breath. Knowledge comes, as Tennyson said, but wisdom lingers.

And we, in medicine, are in as great a quandary as anyone else—perhaps greater. The solid core of medicine remains unchanged. In the last analysis, all our effort is directed to healing the sick, but the growing edge of it is outstripping us. It is with this growing edge of medicine—now usually referred to as research—that I want to concern myself in these lectures, and this for a number of reasons. My prime reason is that we are here to honour a man who, on his record, was on the one hand an original thinker and research worker of great quality, and on the other a scholar and philosopher. By this happy conjunction of abilities so vigorously and devotedly developed he achieved success and eminence in his day; but in his scholar's way he, like some of us, might be rather bewildered by the huge spate of research information that threatens to engulf us. And he, too, might be feeling spiritually a little ill at ease about it all, wondering if its motives and its performance are as sincere and worth while as at first sight would appear, so that I believe he would be glad if, in his name, we paused for a moment to review the situation and to carry out a stock-taking. Such an assessment must no longer be in general terms geographically, but must include those aspects which are specific to Australia. For, in the last few decades, we have seen the beginning of great changes in our local scene—full-time clinical professorial units in all our capital cities, clinical and non-clinical research units as specific entities, an Australian Universities Commission with financial resources that are respectable rather than lavish, a National Health and Medical Research Council and a Commonwealth Scientific and Industrial Research Organization with increasing funds. The most recent development has been the appearance of certain voluntary organizations designed to assist research and education in certain broad fields. The life insurance offices have contributed substantial sums annually to the study of cardio-vascular disease, and, more recently, the National Heart Foundation has been set up to increase the efforts in this important field. Post-graduate and children's medical foundations are bringing further support, cancer councils in some States are distributing significant sums of money, the Royal Australasian College of Surgeons, The Royal Australasian College of Physicians and the Australian College of General Practitioners are adding their quota to both education and research, and, from time to time, grants are received from our well-wishers overseas at the Nuffield, Rockefeller, Wellcome and other foundations. We even have unfolding before us the splendid concept of an Australian National University, well designed, beautifully housed, adequately financed and staffed by men of great distinction. If ever there was a sign of our national maturation, this is it.

It is difficult to visualize history as it is happening—hindsight is so much easier and sometimes (but not invariably!) more accurate. To try to make an assessment of contemporary trends is therefore a formidable and perhaps fallacious task, but on balance it must surely be accepted that all this activity directed towards the encouragement of research is fundamentally right, proper

and good. We could, perhaps, justify it—if we wished to be chauvinistic—on the single ground that it is no longer necessary for a State like South Australia to export permanently its Braggs, Floreys and others; from now on, our local opportunities and facilities should be such that their great potentialities can remain with us and they can influence and inspire our younger folk. That is the safeguard of our future. And, if such be needed, we can offer other justification for all this, but is it needed? Can any truly valid criticism be offered? Is there in fact a dull, tarnished obverse to this bright, shining coin? Or is any such criticism just an example of Newton's third law about action and reaction being equal and oppositely directed? At least the situation is worthy of cool, detached assessment.

However, before embarking on it, let me light a candle and offer a propitiatory sacrifice before the altar of wisdom of men like Sir Edward Stirling and pray for guidance. As one who is neither true scientist nor true scholar, let me admit to feeling foolhardy in attempting to discuss so thorny a problem as the philosophy of research and let me ask your generous indulgence in advance. When this appraisal is done, I would like then to place before you some of the research endeavours of our department of surgery in Sydney. The second task is by far the easier from both your point of view and mine, but the former is the more important. Like the child at tea, we must have our plain bread and butter before we are allowed any cake.

The Philosophy of Research.

The word "research" has suffered some very rough handling over the past few decades. Its traditional meaning has been "to investigate or study closely", not just to investigate or study. It implies that the subject under research will be looked into minutely and carefully, that as far as possible the basic facts will be ascertained and that, once obtained, their interpretation will be cautiously examined with scrupulous accuracy and honesty. Personal opinion, preconceived idea or prejudice plays no part in the process at any point. A concept such as this is a simple one, yet there are many obvious and hidden difficulties.

In the first place, the idea of research has become debased. Its scientific *cachet* was too attractive for it to escape the attention of the astute commercial promoter or feature writer. If the broadcaster, telecaster or manufacturer wants to get a rough estimate of how his products are being received, he makes a few phone calls or sends a number of visitors to homes, takes some very random samples and calls the project "sales promotion research", rather than the superficial scanning that, in fact, it is. The facile label does the trick—if one calls it research, then automatically it is both respectable and important.

Many other examples of this sort of thinking come to mind and not all of them are in the world of commerce. The blandishments of some of the less ethical manufacturing chemists that clutter our mail, or even some articles in less discerning medical journals, show how insidiously the contagion spreads.

True research, like true teaching, requires training in both thought and method. It cannot be accomplished simply by expressing a desire to carry out research, putting on a white coat and entering a laboratory. The potential research worker must think out or be provided with a project and must read extensively about his topic to discover what has already been accomplished in this field, and therefore he must know how to use the resources of a library properly. He must then decide on a method of investigation and be prepared to vary this as difficulties of technique or unexpected preliminary findings indicate. He must understand the importance of rigid control and be patient with the hard grinding labour of repetition that is so integral a part of both experiment and control. And he must examine his results cautiously and sceptically. He requires both wise supervision and adequate encouragement, otherwise he may lose heart and interest when faced with the difficulties and frustrations that are an integral part of most projects. And those who support him must clearly realize that research cannot be conducted on a 10% dividend basis—that the expenditure of money and effort may pay off handsomely, but also may fail completely and have to be written off.

Finally, he must know how to present his results clearly and in proper form. This, in itself, is no easy task, but if it is not done the work loses most of its value. We have seen this happen time and again in medical history. There are those who think, for example, that the credit for being the first great anatomist should go to Leonardo da Vinci, rather than to Vesalius. That great humanist did indeed turn, in his later years, from art to science and he did work systematically at human anatomy, many years before Vesalius. His drawings of the human body — 750 in number — are the wonder and delight of modern anatomists; but they were not published in his own lifetime. In fact, they were never published in their entirety until less than 50 years ago. They had no influence on thought. They directed no expedition against ignorance or superstition. As a modern anatomist says: "Leonardo was the first to create a new anatomy, but he created it for himself alone. Vesalius demonstrated a new anatomy to the world." No one any longer hopes to be a Vesalius or da Vinci, and the field is narrower these days. But work that is not published is substantially lost and in any case it should be presented for the critical appraisal of others. Carefully observed data, if publicly recorded, are never lost, and though the information may be of little apparent significance at the time, its use may be considerable in the future as further efforts are made in this or allied fields.

There can be no question of the value of this sort of effort. The intellectual discipline, the clear thinking and the concentration necessary to penetrate the surface and enter the depth of any problem, however apparently trivial, are inevitably of benefit to anyone concerned in so diffuse a subject as modern medicine. Should the person concerned be engaged in the practice of medicine, the training is invaluable and the standard of his thinking is improved. Should he be a teacher as well, it is, I believe, his bounden duty to make some research endeavour; it is quite wonderful to see how merely grappling with an apparently simple problem reduces the dogmatism and increases the liberality of his teachings.

If it is accepted then that adequate research must be built on a basis of consistent, accurate, honest and repeated observations involving sustained personal effort, how can it go wrong in either ethic or performance?

One way stems from the attitude of some young specialists who, having acquired a reasonable vocational training, usually partly in Australia and partly abroad, find on commencing practice that some spare time is available and that the idea of "playing around with a bit of research" could be of advantage, both as a salve to conscience and as an aid to a future career. A token expenditure of effort, some papers "in preparation" and an air of mild mystery can be most impressive either on interview or in an application form. The idea was frivolous from the beginning, and not only money but precious time and effort on the part of the supervisor can be wasted. On the other hand, if the person concerned is serious in his intention, he must be encouraged and assisted quite wholeheartedly, for enthusiasm of this sort can be a fragile flower, which if protected and tended will bloom and attract others, but if exposed to a too inclement climate will fade and wilt. But how much better for, let us say, the young surgeon just returned from abroad full of enthusiasm and ideas, complete with diplomas and qualifications, to spend his spare time looking into a problem and perhaps making a contribution to knowledge, rather than assisting a colleague at operations or, like the blind Milton, giving service by standing and waiting.

It is the idea of the contribution which is important. Research, clinical or laboratory, major or minor, full time

or part time, is best thought of as an attempt to contribute to knowledge. To us in Australia, the idea of trying to offer something in return for all that medicine gives us should be particularly attractive. How fortunately we are placed! Because there is in our country no hereditary aristocracy and because our medical forebears gave devoted personal service, the doctor is accorded a high and respected place in our social hierarchy. He can command a very considerable financial reward for his labours, but can still retain the priceless privilege of being able to give his services without payment to his fellow man, who turns to him for help. He can practise his art and his craft with complete freedom and use methods, measures and skills that are effective beyond the wildest dreams of two or three decades ago. This must surely be a golden age in medicine, and we should be aware of our great good fortune. How much better to recognize it, and to attempt to return a little for the many advantages so freely bestowed on us than to be always a taker; how easy to give if we recognize that the effort, when honestly made, will add to the quality and stature of the giver!

Hospital Infection.

I propose now to report to you some of the efforts that we are making in my department in Sydney to live up to these principles. First, I offer a review of our efforts to assess the ravages of hospital infection and an account of some of the efforts being made to deal with the problem.

Some of us are really very frightened by the problem of wound infection in general and of the staphylococcus in particular. We recognize that the problem is no new one and that it has always been a contentious one—Lord Lister certainly found it so. One of the main obstacles to progress ever since the principles of aseptic surgery were established has been the surgeon himself. As his stature and dignity have increased, he has become progressively more protected, so that nowadays his registrar is most reluctant to inform him that his patients are getting infected wounds or are having an unduly prolonged convalescence, and he himself hears only of other people's bad results. His attention has been mainly focused on the drama and challenge of the operation, but, in recent years at least, he has recognized that the pre-operative and post-operative preparation and care of the patient are so integral a part of the operative procedure that he himself must assume major responsibility for them. However, he has felt quite justified in not concerning himself seriously about the occasional infected wound. It is rarely lethal, it usually resolves ultimately, complications such as wound herniation may not develop for ages, and may then be treated by someone else, and, in any case, it is best handled by his registrar or house surgeon.

Indisputable evidence exists from all parts of the world that infection of surgical wounds is occurring with disquieting frequency. The observed data indicate that the organism mainly concerned is *Staphylococcus aureus*, that these organisms are, in most instances, being born and bred in the hospitals themselves and that the likelihood that they will increase in both frequency and possibly virulence is present. The reaction of the surgeon to these facts as they have emerged, and as they have been corroborated, has followed a very usual pattern. On the one hand, there is the minority that regards this as a very serious problem, and there are even some who are so apprehensive about its sinister possibilities that they feel it is likely to be one of the biggest problems facing general surgery. On the other hand, there are those who regard the situation with bland indifference, and there are even those surgeons who flatly deny that any of their wounds ever become infected. Others admit that sometimes they have a little trouble, but never anything like the horrors that are reported from the professorial unit, where this problem is being investigated. But, they imply, horrors and curiosities of all sorts are only to be expected from such odd places as professorial units.

In the University of Sydney, and particularly in the Royal Prince Alfred Hospital, there has been a very keen interest in the antics of the staphylococcus, and as long ago as 1950-1951, Dr. Edgar Thomson and Dr. Phyllis Rountree were doing some highly significant work on it. They pointed out that there was a rising incidence of strains of antibiotic-resistant staphylococci, and that from the beginning this was an institutional problem.

Since those days, Dr. Rountree has been keeping a very close tab on all the swabbings which come into the bacteriology department for any reason at all and which harbour the staphylococcus, and one of the surprising features of this has been that whilst antibiotic resistance has developed fairly rapidly once any particular agent came into unrestricted use, the actual number of staphylococcal swabbings received in the laboratory has not significantly changed over these last many years (Figure I).

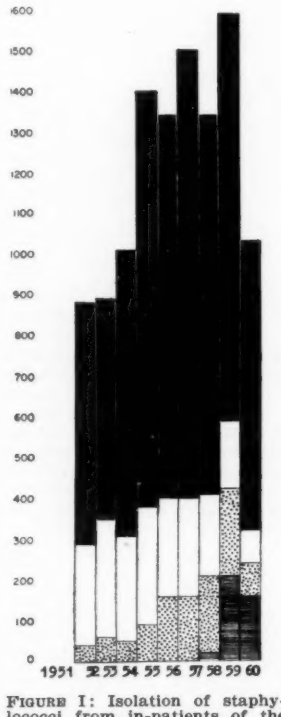

FIGURE I: Isolation of staphylococci from in-patients of the Royal Prince Alfred Hospital from 1951 to 1960. Solid columns indicate staphylococci isolated; open columns indicate those with multiple antibiotic resistance; dotted columns refer to those with chloramphenicol resistance; hatched columns refer to those with erythromycin resistance.

Our clinical interest in this work started four years ago, when Mr. B. P. Morgan and I instituted a purely clinical survey of clean surgical wounds. Some 764 of them were carefully scrutinized. They were all uncontaminated wounds which should have healed by first intention, but 8% of them showed obvious clinical infection.

More recently, a much more intensive survey was taken to try to identify the source of the infection. Over a six-months period patients and staff were systematically and intensively investigated clinically and bacteriologically. In brief, our findings were as follows.

Firstly, in spite of poor and antiquated operating theatre facilities with inadequate ventilation, there was little direct evidence that wound infection was initiated in the theatres. During 25 routine operations some very special

precautions were taken. When the surgeon, the anæsthetist and the whole team were in the theatre, the door leading into it was closed and sealed. A large notice was placed outside the theatre door which read "Experiment in progress—Do not come in", and the crack in the door was sealed with strapping. It is, I think, a tribute to our national characteristic of rugged individualism that on four occasions somebody did, in fact, come into the theatre. Those experiments have been rejected. Once sealed off, this microcosm was intimately investigated. The air in the theatre was continuously sampled; the bowls, drapes, wounds, gloves and instruments and the noses of everyone in the theatre were carefully and repeatedly swabbed. A number of points about which we had only the haziest factual knowledge emerged from this. For instance, during these 25 routine operations 67 people were incarcerated in the operating theatre. Of these 67, 21 were surgeons, anæsthetists or visiting doctors, 14 were nursing sisters, 16 were student nurses, 10 were medical students and six were instrument and X-ray attendants. From them, 167 nasal swabs were taken and in 46% of them the *Staph. aureus* was isolated. Of these 67 people, no less than 42% were carriers on at least one occasion. Out of the whole group of 67 the permanent members of the surgical team numbered nine, and of this nine, six were permanent nasal carriers. However, no patient was apparently infected in the theatre with any of these strains, and it would seem that few of these carriers were dispersers of their organisms and possibly their strain was not highly virulent. But the potentialities of this situation are considerable, and there have been numerous reports of quite appalling disasters that have occurred under different carrier circumstances, when any one member of the team has been a carrier and active disperser of a highly virulent strain. Under present conditions, in most places a series of quite major tragedies could easily occur in this way before effective action to track down the source or sources of infection was taken. There are many amongst us who regard with amusement or even contempt those who offered violent opposition to Lister for some 20 years, who could do nothing but vilify the principle of antisepsis and who ridiculed the attempts of men like Spencer Wells and Lawson Tait to introduce simple cleanliness as a prelude to asepsis into the operating theatre. How obvious it all is to us now. But what is posterity going to say about our indolent acceptance of a dangerous situation, and of our delightful laissez-faire attitude to antibiotics in general? Whatever the judgement, one aspect of it is inevitable—that we have less excuse than our forebears had.

Secondly, a total of 217 wounds was intimately examined. Clean wounds were those in which no possible reason for contamination was present, and if any such possibility existed, the wound was classified as dirty. A cross-infection rate of 14% occurred in clean wounds, and no less than 68% in dirty wounds (Table I).

TABLE I.
Cross-Infection of "Clean" and "Dirty" Wounds.

Type of Wound.	Number of Cases.	Uninfected Wounds.	Infected Wounds.
Clean ..	198	171	27 (14%)
Dirty ..	19	6	13 (68%)
Total ..	217	177	40 (18%)

The site of the wound on the body or the sex of the patient did not significantly affect the infection rate, nor was it influenced greatly by the surgeon. However, the type of dressing did so. Gauze pads, which absorbed blood, serum or sweat, and which required early post-operative changing were associated with a much higher incidence of wound infection than were the spray-on plastic seals "Healex" or "Nobecutane" (Table II). While 61% of wounds were infected under a gauze pad, only 7% were infected when the wound was sealed.

Of the total some 40 wounds showed cross-infection, and of these, 35 or 87% were infected with *Staph. aureus*. The predominant staphylococcus present in 60% of wounds was phage type 47, which is resistant to penicillin, streptomycin and tetracycline and usually chloramphenicol and erythromycin. These are the strains which Rountree and Thomson discovered had been present in the hospital since 1951 and which had been the chief cross-infecting organisms in our surgical wounds since then.

TABLE II.
Relation of Infection to Type of Dressing.

Type of Dressing.	Number of Cases.	Uninfected Wounds.	Infected Wounds.
Plastic seal	171	159	12 (7%)
Gauze pad:			
Clean wounds ..	27	12	15 (56%)
Dirty wounds ..	19	6	13 (68%)
Total ..	217	177	40 (18%)

Review of ward conditions showed wards to be heavily contaminated with staphylococci to an almost horrifying extent. The organism was recovered in large numbers—and repeatedly—from the dust on the floors and the furniture, the dressing trolleys, the aprons and caps of nurses, the blankets and so on. Not unexpectedly there-

TABLE III.
Staphylococcus Aureus in Noses Swabbed Weekly.

Bacteriological Data.	Patients.	Staff.
Weekly swabs taken	854	456
Positive swabs	403 (48%)	182 (40%)
Loss of strains	34 (4%)	25 (5%)
Acquisition of strains	84 (10%)	27 (6%)
Phage type 47 present.. ..	118 (14%)	36 (8%)
Phage type 80/81 present ..	40 (5%)	21 (5%)

fore the noses of patients were found to become extensively colonized. Their noses were swabbed on their admission to hospital and weekly subsequently. Some 10% of the patients' noses and 6% of the staff's noses were found to acquire staphylococci each week (Table III). Put in a

TABLE IV.
Nasal Carrier Rates for Staphylococcus Aureus in Patients with no Operation, with Uninfected Wounds or with Infected Wounds.

Description of Patient.	Number of Patients.	Nasal Carriers on Admission.	Number Becoming Carriers in Ward.
No operation performed ..	68	24 (35%)	14 (21%)
Operated upon:			
No infection	177	56 (32%)	40 (23%)
Wound infected with *Staph. aureus*	35	17 (49%)	20 (57%)
Wound infected with other organisms ..	5	3	2
Total	285	100 (35%)	76 (27%)

different way, this means that of the 285 patients intimately and repeatedly surveyed, 35% were found to be nasal carriers on admission, but a further 27% acquired staphylococci while under our treatment in the ward (Table IV). This by-product occurred irrespective of whether the patient was operated on or not. If the patient

had acquired a staphylococcus in his nose, he had a 9% better chance of getting a wound infection, and more than half of those who had a staphylococcal wound infection had acquired their nasal staphylococci during their time in the ward. Among the 40 patients with infected wounds, 14 escaped without consequences. In five cases death ensued from other causes, but in one case death was the result of the infection. Two wounds disrupted, and of the remaining 20 patients three were obliged by their infections to remain in hospital for up to five days longer than they would have done otherwise, nine were detained for up to 10 days, three for up to 15 days, one for up to 20 days, one for up to 25 days, two for up to 30 days and one for up to 35 days.

The assessable consequences of infection were considerable. There is a strong feeling in my unit—not yet capable of full confirmation—that patients who suffer a severe post-operative ileus frequently show severe degrees of wound infection, and that the ileus may in fact be a low-grade staphylococcal peritonitis.

It is difficult properly to assess the ultimate results of this type of post-operative complication. We are sowing the wind and the whirlwind is yet to be reaped. One thing is clear: if we compare the length of stay of patients with infected wounds with the average on our unit of the same type of surgical complaint, and group them in five-day increments, it can be seen that 290 patient days were lost—that is, about 5% of the bed strength.

The measures designed to combat this menace are being widely studied. While the findings of investigators, wherever they are working, are in substantial agreement, the interpretation of the findings is greatly hampered by our ignorance of certain basic knowledge. For instance, no adequate test exists for the pathogenicity of the staphylococcus, so the true significance of colonization of patients' noses can only really be guessed at. How long do the organisms remain virulent in the carrier state and in the ward environment? What are the factors concerned in the dispersal of staphylococci from the nose? What is the route of transfer from nose to wound—is it by droplet, by direct continuity with the skin or through inanimate objects, such as blankets? What part does perineal contamination play? When will the riddle of the human body's immune response to the staphylococcus be even partly solved? The answer to these and many other similar problems is at present unknown.

The attack on such a vague enemy, if it is to have a reasonable chance of success, may require new thinking on such basic matters as even the design of our hospitals, and in Sydney we are having the opportunity to do this. With the support and encouragement of the Minister of Health in New South Wales, the Honourable W. F. Sheahan, and the cooperation of Sir Herbert Schlink, the Chairman of Directors of the Royal Prince Alfred Hospital, we are now building a new professorial block, in which the planning has been directed to eliminate cross-infection to the limit of our present knowledge. We have been given great freedom, and the Government Architect of New South Wales, Mr. E. H. Farmer, and I have together designed this unit without the doubtful benefit of any committee. It comprises ward nursing units for the professors of medicine and surgery, four operating theatres with ancillaries, and a central sterile supply department. It should be ready for occupation early in 1962. The following various measures have been taken specifically to reduce infection.

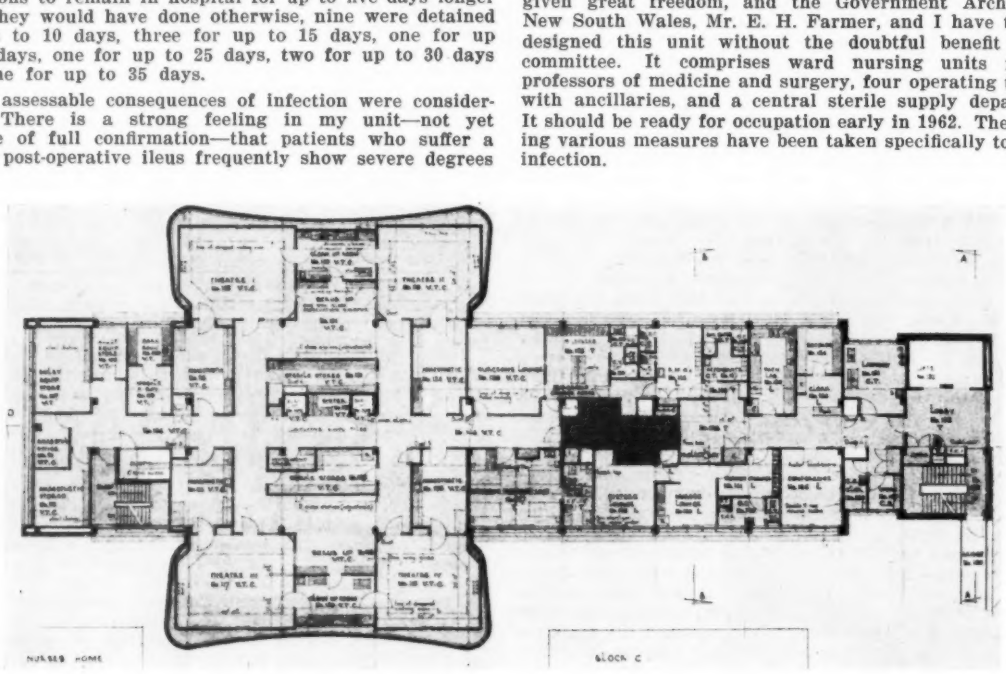

FIGURE II: Operating theatre floor of new professorial block. Hatched area represents airlock.

The four operating theatres are isolated by an airlock (Figure II). Both patients and staff must change completely on entering and leaving the theatres. Patients are transferred from the ward to the anæsthetic trolley in the airlock and, of course, linen and blankets are changed at this point. Staff enter their change rooms on the outside of the airlock, male on one side and female on the other, and, after changing, enter on the inside of it.

Ventilation is arranged at a high level of 17 changes of air per hour, with the flow of air so contrived that it passes primarily from the theatres, where there is a slight positive pressure, through the anæsthetic rooms and through the airlock, so that the current at this point is always from the theatres outwards. Cross currents from the theatres have been avoided by exhausting the intervening rooms, so that contamination from a dirty case in one theatre to a clean case in the other is avoided. We believe that a dirty theatre is an anachronism—the provisions for asepsis should be such that any degree of cross-infection can be safely handled.

The ventilating equipment sufficient to handle such a large volume of air in itself creates a problem. None of the air can be recirculated; it has to be dehumidified to 50% in a climate in which humidity may reach approximately 100%, cooled to 70° F. in summer or warmed in winter, filtered both by an electronic precipiton and by a mesh filter, made to flow in the right directions and arranged in duplicate, so that when only one set of theatres is in use, half the equipment can be switched off and adequate maintenance carried out. In the belief

that absolute physical cleanliness is required, the theatres have been designed so that they can be hosed out at the end of each day's work. This requirement has necessitated special recessed water-proofed power outlets and a hard impermeable jointless wall finish. For the latter, it would seem likely that fibreglass sheeting should prove admirable. All instruments will be prepacked, autoclaved and delivered direct to the theatre by service lift from the central sterile supply department. After use, they are rough cleaned and, together with all dressings and drapes, removed from the theatre suite as soon as possible by a separate service lift. Both lift shafts are exhaust-ventilated. Within the clean area, an intensive nursing unit of four beds is provided for the intimate care of certain major operation patients, but not for all patients. It is believed that only a small minority of patients require this detailed supervision and that the surgeon and anæsthetist are the ones to direct it—not the junior house surgeon who, under our present circumstances, does so. The unit has therefore been sited so that both surgeon and anæsthetist can continue operating on further patients during the recovery phase of the difficult case, which universally takes pride of place at the beginning of an operating list. This unit has one other use. At present, the severely damaged victim of motor-vehicle or industrial accidents, when brought to the hospital, goes through a series of moves on trolleys, on and off examination couches, X-ray tables, ward beds and so on, which, in certain critical cases, are sufficient to rob him of whatever slender chance of survival he may have. We have therefore quite deliberately planned to break this chain in the interest of patients with multiple injuries in a critical state. They will be brought into the airlock complete with their road dirt on an ambulance stretcher and will be transferred direct to a bed from the intensive nursing unit in the airlock. In the unit they will then be stabilized, transfused, examined radiologically with a powerful mobile unit which is immediately available, and, when fit for operation, taken directly into the operating theatre on their bed. After operation they will be kept in the unit until well enough to be transferred to the ward. The only apologia for this planned variation is that we think that the patient picked off the road is probably bacteriologically less hazardous than one who has occupied a clean hospital bed for a week or two previously. Needless to say, this intensive nursing area has an entirely separate ventilating unit so designed that there will be no backleak of air into the main theatre zone.

The design of the wards (Figure III) has been influenced by the requirement that they should be available for use by either one sex or both or that heavy and light cases can occupy different areas. A ward treatment room, where all dressings are done with individual dressing trays provided from the central sterile supply department, is an integral part of the ward arrangements. It is anticipated that no dressings will be done in bed in the ward, and access to the treatment room has been provided for the whole bed to be moved into it. This room also has separate ventilating equipment which gives four to five changes of air per hour. Clearly, without this essential provision, such an area becomes a source of potential danger, rather than of safety, but hospitals are still being built without it.

By simple partitioning of some wards and the provision of a sufficient exhaust fan into these areas, nasal staphylococcal carriers can be effectively isolated. Four single rooms are provided on this plan, and it was suggested that these should be used for segregating carriers. However, these rooms are for use of the seriously ill, and the nasal carriers are commonly well patients who may not require operation as part of their treatment. Another innovation is the provision for each four-bedded unit of a toilet and wash-basin. We are hopeful that this will reduce the nursing demands, but have taken the precaution of providing the toilet with a self-closing door and exhaust ventilation.

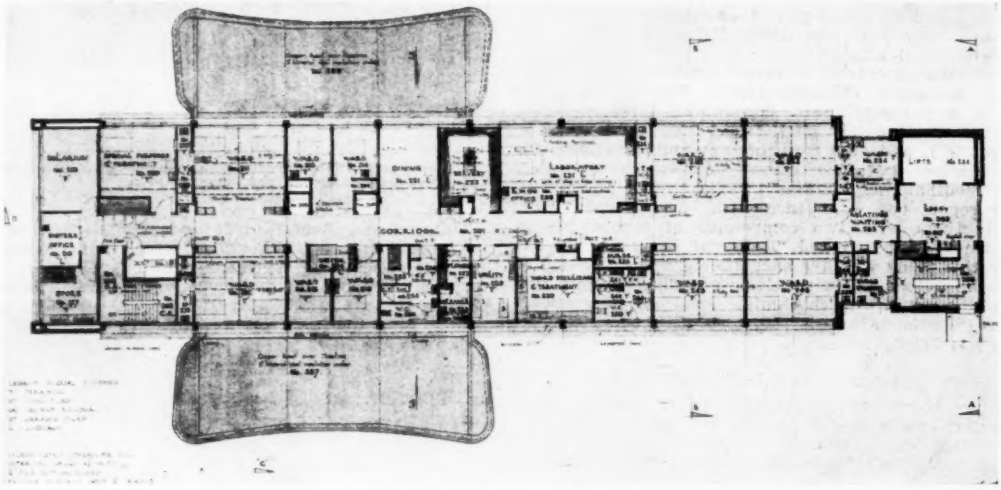

FIGURE III: Layout of ward floor of new professorial block.

The results of this type of planning are yet to be observed. The base line has been established over some two and a half years, and the incidence of wound infection and cross-infection and the trends in them have been recorded. The same system of observation will continue when the new block is used, and an accurate comparison should be possible. This will be of value in indicating the effectiveness of the overall planning, but unfortunately it will not help in elucidating the present most pressing problem—what is the comparative importance of the various measures necessary to deal effectively with staphylococcal cross-infection? Which ones are major and mandatory and which ones are minor but desirable? Until these are known, our attack is unfortunately diffuse and dispersed, and the inclination to deal with the problem by ignoring it can go largely unchallenged.

Perhaps our greatest individual contribution would be to lower what has been appropriately called our "threshold of awareness" to infection and so to confront the problem in the best Edward Stirling tradition.

THE DRUG THERAPY OF MIGRAINE.

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AND
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DESCRIPTIONS of migraine date from the earliest years of the Christian era. Although the condition is common, it is difficult to estimate the prevalence of migraine in the general population. Ask-Upmark (1960) quotes a figure of 30% if only females are considered and if minor attacks are included, and 3% if both sexes and only severe attacks are considered. The figure of 5% to 10% suggested by Merritt and Friedman (1959) appears to be a reasonable estimate.

The use of ergot in migraine dates from 1883 (Eulenberg) and that of ergotamine from 1926 (Maier). The addition of caffeine has been found to increase the effectiveness of ergotamine tartrate (Ryan, 1949: Friedman, 1957), but unfortunately oral administration is a less effective form of therapy than parenteral or rectal administration, which are often necessary (Greene, 1959). The recent introduction of a preparation of ergotamine tartrate which is absorbed sublingually and from the buccal mucosa ("Cafergot Q"), and of a form of ergotamine suitable for oral inhalation and absorption from the respiratory mucosa ("Medihaler-Ergotamine") was therefore of interest. We now report our experience with these preparations, comparing them with two compounds of ergotamine in tablet form ("Cafergot" and "Bellergal Retard"). In the course of this study we have encountered several examples of migraine associated with electroencephalographic evidence of cerebral dysrhythmia, and of migrainous neuralgia (Harris, 1926 and 1936). The treatment of these conditions is briefly reviewed.

Material and Methods.

The series comprises 77 patients. In 10, the diagnosis was considered to be that of periodic migrainous neuralgia. This condition was first described by Wilfred Harris in 1926 and again in 1936 (ciliary neuralgia). Symonds (1956) discussed this condition under the title "a particular variety of headache", and it is also referred to as "histamine cephalgia" (Horton, 1941), "cluster headaches" (Kunkle *et alii*, 1952) and "greater superficial petrosal neuritis" (Gardner *et alii*, 1947). The essential features of the syndrome, recently reviewed by Bickerstaff (1959), consist of paroxysmal attacks of severe unilateral facial and orbital pain, throbbing in character, occurring at the same time each day for several hours and in bouts lasting for several weeks. During these paroxysms the eye on the affected side becomes reddened and weeps, the nostril becomes congested and the face may flush.

Among our 10 patients there were seven males and three females, reflecting the male predominance reported in other series. In nine instances the onset was prior to the age of 50 years. In no instance was a family history of migraine obtained.

The diagnosis of migraine in the other 67 patients was based on the criteria suggested by Friedman, Von Storch and Merritt (1954), which included: (i) recurrent headaches, throbbing in character, usually unilateral at the onset, and occurring against a background of well-being; (ii) nausea, vomiting or irritability occurring at the height of the attack; (iii) temporary prodromal features —usually visual—preceding the attack; (iv) a family history of migraine commonly being present; (v) no clinical evidence of organic neurological disease being found; (vi) where practicable or indicated, ancillary investigation such as radiological examination of the skull, electroencephalography, angiography and pneumoencephalography revealing no abnormality.

Electroencephalography was performed in 41 of the 67 patients with migraine. In 25 instances (37·3%) the recording was regarded as being abnormal, in that there was bilaterally synchronous slow activity suggestive of instability of regulating structures in the deep grey matter. These 25 patients were placed in a separate category and their malady was described as "dysrhythmic migraine". The age and sex distribution of the 67 patients with migraine are indicated in Table I.

There is no general agreement as to the incidence of electroencephalographic abnormalities in migraine. Dow and Whitty (1947) found a high incidence of dysrhythmia in migraine, and Selby and Lance (1960) reported abnormal records in 29·8% of their series.

TABLE I.
Age and Sex Distribution[1] in 67 Patients with Migraine.

Age Group of Patients. (Years.)	Migraine Sufferers.		Dysrhythmic Migraine Sufferers.		Total.	
	Male.	Female.	Male.	Female.	Number.	Percentage.
1–10 ..	2	1	3	1	7	10·5
11–20 ..	4	16	4	4	28	41·8
21–30 ..	1	5	1	3	10	14·9
31–40 ..	4	5	1	5	15	22·4
41–50 ..	4	—	1	2	7	10·4
Total ..	15	27	10	15	67	100·0

[1] Ratio of males to females among migraine sufferers of all ages was 1 : 1·8 and among dysrhythmic migraine sufferers 1 : 1·5.

Halpern and Bental (1958) considered such cases may be masked epilepsy. The 25 patients in this group of the present series had typical migraine symptoms; the age and sex incidence for dysrhythmic migraine was generally similar to that of the 42 patients in the typical migraine group; the response to ergotamine therapy was similar, but whereas anticonvulsant (phenytoin) therapy diminished the number of headache attacks in the dysrhythmic group, it was of little or no value in the prevention of headaches in the migraine series. Finally there was in the dysrhythmic migraine group a clinical history of major seizures in seven patients, of psychomotor attacks in three, of episodic vertigo in one and of transient attacks of hemiparesis associated with the headaches in one. A family history of migraine occurred in 26 patients (63%) of the migraine series and in 10 patients (40%) of the dysrhythmic group. Epilepsy occurred in the family of three patients (12%) of the dysrhythmic series. No similar history was obtained for the families of the pure migraine patients.

The 67 patients with migraine and with dysrhythmic migraine were treated with one or other of the preparations being studied. The drugs were allocated in a random manner, a sufficient supply of each being issued for the treatment of three attacks of migraine before the patient crossed over to another form of therapy. In fact the average cross-over occurred between two and three attacks, as some patients would not persist with a form of therapy they found ineffective. Each patient was given a form with directions for the drug administration. They were asked to record on it the dates of migraine attacks, the number of tablets or inhalations required to secure relief, the degree of relief obtained, the time which elapsed before relief was achieved, other symptoms which were experienced, and any comments which they might like to make.

The drugs employed in this series were four in number. "Cafergot" tablets were used, containing 1 mg. ergotamine tartrate and 100 mg. caffeine. Patients were advised to swallow one tablet at the first sign of a migraine attack and to swallow a further tablet every half hour until the attack ceased, or until a maximum of six had been taken in any one attack. "Cafergot Q" tablets contain 1 mg. ergotamine tartrate and 100 mg. caffeine, together with a flavouring agent. Patients were directed to chew the tablets without swallowing. The number of tablets and the frequency of administration were as for "Cafergot".

ILLUSTRATIONS TO THE ARTICLE BY RONALD D. FINE.

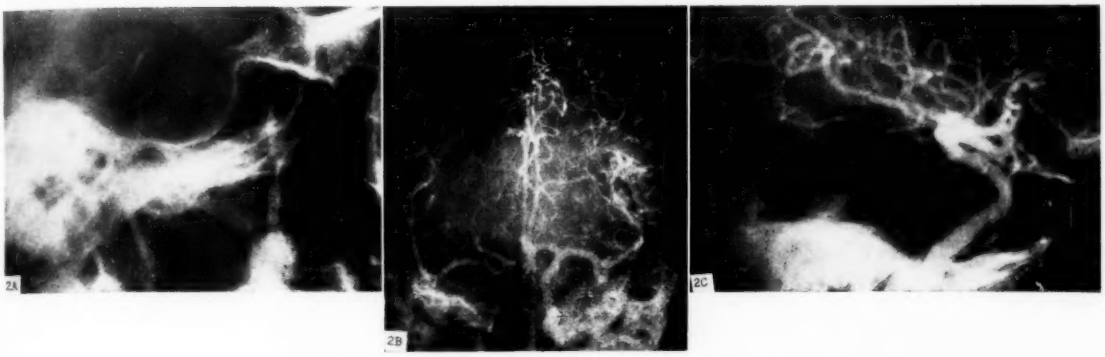

FIGURE IIA: Röntgenogram of skull showing enlarged pituitary fossa with depression of the floor and erosion of the dorsum sellæ. FIGURE IIB: Left carotid angiogram showing good collateral circulation via the anterior communicating artery. FIGURE IIC: Left carotid angiogram showing elevation of bifurcation of internal carotid artery.

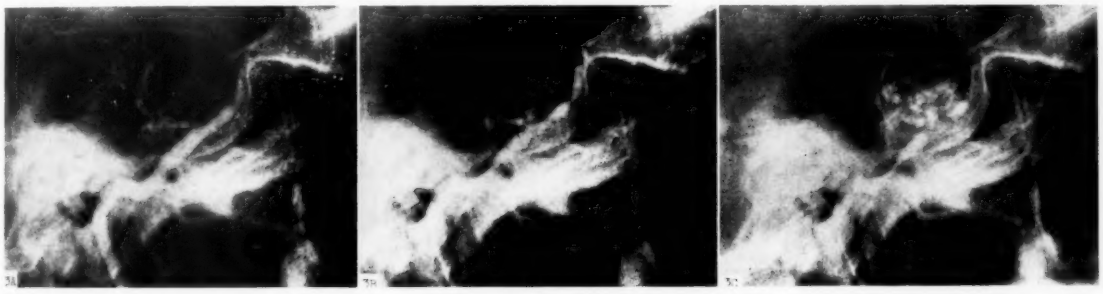

FIGURE IIIA: Complete obstruction of internal carotid artery at level of cavernous sinus (right). FIGURE IIIB: Right internal carotid angiogram showing pathological circulation within the pituitary gland. FIGURE IIIC: Right internal carotid angiogram showing pathological circulation within the gland.

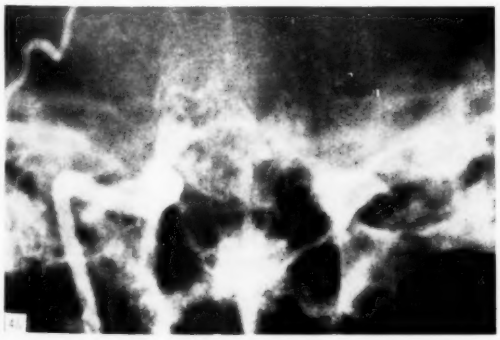

FIGURE IVA: Right carotid angiogram (antero-posterior series) showing abnormal group of vessels situated in the mid-line

FIGURE IVB: Right carotid angiogram (antero-posterior series) showing abnormal group of vessels situated in the mid-line

ILLUSTRATIONS TO THE ARTICLE BY PETER BAUME AND IAN MONK.

FIGURE I: Postero-anterior view of the chest in Case I. A large opacity is seen situated below and behind the right lower lobe. The X-ray film taken one year earlier had been clear.

FIGURE II: X-ray films of the long bones in Case I, taken two weeks before operation. They show diffuse symmetrical lamellar periosteal proliferation characteristic of hypertrophic osteoarthropathy.

FIGURE III: Postero-anterior view of the chest in Case II. The shape of this large opacity did not alter in films taken with the patient on her side. In spite of the size of the tumour and the degree of mediastinal displacement she complained of no pulmonary symptoms.

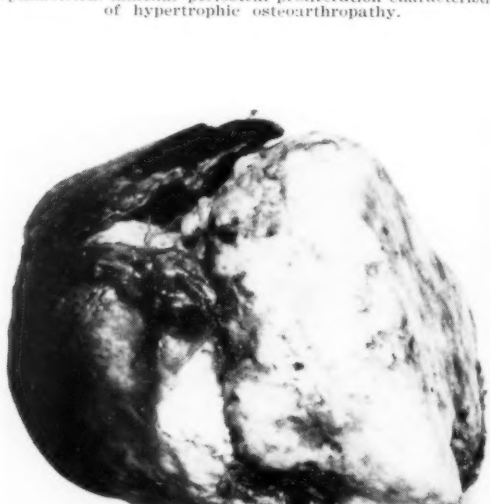

FIGURE IV: This tumour caused the opacity seen in Figure III. The left lower lobe is seen surrounding the right edge of the tumour, which resembled a giant uterine fibroid. The scale is measured in centimetres.

TABLE II.[1]

Results of Drug Therapy in 411 Attacks of Migraine in 67 Patients.

Table IIA.

Drug.	Number of Patients Treated.	Number of Attacks Treated.	Number of Attacks per Patient.	Satisfactory Relief Obtained.	Improvement Obtained.	No Relief Obtained.	Failure Due to Side Effects.
"Cafergot"	50	106	2·12	52 (49·2%)	36 (34·0%)	14 (13·0%)	4 (3·8%)
"Cafergot Q"	47	107	2·28	71 (66·3%)	20 (18·7%)	9 (8·5%)	7 (6·5%)
"Medihaler-Ergotamine" ..	40	84	2·10	58 (69%)	6 (7·1%)	13 (15·6%)	7 (8·3%)
"Bellergal Retard"	56	114	2·04	56 (49·1%)	47 (41·2%)	9 (7·9%)	2 (1·8%)

TABLE IIB.

Type of Drug Used.	Attacks Treated.	Satisfactory Relief Obtained.
Rapidly-acting forms ("Cafergot Q" and "Medihaler")	191	129 (68·0%)
Slowly-acting forms	220	108 (49·1%)

[1] $\chi^2 = 6 \cdot 060$, hence $P < 0 \cdot 02$.

"Bellergal Retard" tablets each contain ergotamine tartrate (0·6 mg.), phenobarbitone (40 mg.) and the total alkaloids of belladonna ("Bellafoline") (0·2 mg.). For migraine, patients were directed to swallow one tablet and repeat this dose at hourly intervals up to a total of three for any single attack. "Medihaler-Ergotamine" contains microsized ergotamine tartrate. A dose of 0·36 mg. is delivered with each depression of the valve of the inhaler. Patients were directed to take a single inhalation and repeat this at five-minute intervals to a maximum of six inhalations, unless the headache was relieved earlier.

Results and Discussion.

The results of therapy in 411 attacks of migraine in 67 patients are detailed in Tables IIA and IIB; and the average dose of active principle (ergotamine) employed is indicated in Table III. It is notable that the more quickly acting forms of ergotamine (sublingual and inhalational) produce a statistically significant increase ($P < 0 \cdot 02$) in the success rate of therapy. It is well known that

TABLE III.

The Dose of Ergotamine Employed.

Drug.	Amount of Egortamine per Dose (mg.).	Range of Dose (mg.).	Average Dose of Ergotamine per Attack (mg.).
"Cafergot"	1	1–6	3·4
"Cafergot Q"	1	1–6	3·1
"Medihaler-Ergotamine" ..	0·36	0·72–1·80	1·3
"Bellergal Retard"	0·6	0·6–1·8	1·4

the later ergotamine is given in an attack of migraine, the less likely it is to be effective. This and the fact that ingested ergotamine may be lost in vomiting, while sublingual and inhaled ergotamine is more certainly absorbed, possibly explained the greater therapeutic efficacy of these latter forms. It must be remembered that, while comparable dosages of ergotamine tartrate were prescribed in the trial of each of the various preparations, these doses were at times lower than those commonly employed in practice. The purpose of the trial was to compare the efficiency of various routes of administration of ergotamine tartrate rather than to ascertain the maximum success rate of therapy of migraine with this drug.

Side effects occurred in 20 of the 67 patients, but in every instance save one these were of minor degree. The exception was a female patient who developed a superficial thrombophlebitis after taking four tablets of "Cafergot Q". This complication is rare, but has been referred to by Brain (1951), and more recently Carter (1958) has reported three cases.

Nausea and vomiting were the most frequently encountered side effects. In some instances these symptoms may have been manifestations of the migraine attacks, but in others they were drug effects. They were reported by 20 of our patients, with one drug or with several, and were less frequently encountered with "Bellergal Retard" (two instances) than with the other preparations. It was found possible to prevent this side effect in the majority of instances by prescribing chlorpromazine or thioridazine to be taken orally before the ergotamine preparation. Other recorded side effects such as paræsthesia, muscle cramp, joint pains, coldness of extremities or intermittent claudication, and substernal oppression, were not encountered in this series.

Treatment of Migrainous Neuralgia.

Both Symonds (1956) and Bickerstaff (1959) advise a daily injection of ergotamine as a prophylactic during a bout of migrainous neuralgia. After several days of therapy the drug is omitted to see if the bout has come to its termination. If not, the course is repeated.

Our patients reported relief without recourse to parenteral therapy as follows. Relief was obtained from "Cafergot Q" in three instances (two tablets morning and night), from "Bellergal Retard" in three instances (one tablet morning and night), from "Medihaler-Ergotamine" in two instances (two inhalations morning and night) and from "Cafergot" in two instances (two tablets morning and night).

In each instance this therapy was given prophylactically for five days out of seven until the attack terminated.

Interval Therapy.

The aim of the interval therapy of migraine is to prevent further attacks. The relationship of bouts of migraine to emotional stress is well known, so that psychotherapy may be able to play a prominent part in prophylaxis. In many instances this may be carried out at a simple level, merely by giving the patient insight into the psychological mechanism, and explaining how he may modify his environment in order to avoid or minimize stressful situations, or else learn to accept these with greater equanimity. Therapy with sedatives—for example, barbiturates, or tranquillizers—for example, mebrobamate, may also be employed to diminish the emotional reaction to stress. At times formal psychiatric therapy may produce improvement in intractable migraine (Hunter and Ross, 1960).

In migraine which occurs mainly in the premenstrual and menstrual periods, and which may therefore be related to fluid retention, there may be a place for the use of diuretics. Drugs which may be employed as more specific migraine inhibitors include prochlorperazine ("Stemetil"), serotonin inhibitors, anticonvulsants if the migraine is dysrhythmic, and at times small regular doses

of ergotamine given orally—for example, "Bellergal Retard"—rectally or even parenterally.

Summary.

The therapeutics of migraine and the related conditions, dysrhythmic migraine and paroxysmal migrainous neuralgia, are discussed.

The outcome of our experience in migraine therapy with four different ergotamine compounds is considered. It has been shown that the more rapidly absorbed forms (sublingual and inhalational) are more effective than orally administered ergotamine in similar dosage.

Acknowledgements.

We would like to thank Sandoz Australia Pty. Ltd. for making available supplies of the various ergotamine tablets used in the trial, and Riker Laboratories Australia for the "Medihaler-Ergotamine" preparation.

References.

ASK-UPMARK, E. (1960), "Migraine as a Deadly Disease", *Brit. med. J.*, 2: 823.

BICKERSTAFF, E. R. (1959), "The Periodic Migrainous Neuralgia of Wilfred Harris", *Lancet*, 1: 1069.

BRAIN, W. R. (1951), "Diseases of the Nervous System", Fourth Edition, Oxford University Press.

CARTER, E. A. (1958), "Bilateral Thrombophlebitis after a Single Dose of Ergotamine Tartrate for Migraine", *Brit. med. J.*, 2: 1452.

DOW, D. J., and WHITTY, C. W. M. (1947), "Electroencephalographic Changes in Migraine: Review of 51 Cases", *Lancet*, 2: 52.

EULENBERG, A. (1883), *Dtsch. med. Wschr.*, 9: 637; quoted by Krantz, J. C., and Carr, C. J., *loco citato*.

FRIEDMAN, A. P., VON STORCH, T. J. C., and MERRITT, H. H. (1954), "Migraine and Tension Headache. A Clinical Study of 2,000 Cases", *Neurology (Minneap.)*, 4: 773.

FRIEDMAN, A. P. (1957), "Migraine and Tension Headache", *Calif. Med.*, 87: 15.

GARDNER, W. J., STOWELL, A., DUTLINGER, R. (1947), "Resection of the Greater Superficial Petrosal Nerve in the Treatment of Unilateral Headache", *J. neurosurg.*, 4: 105.

GREENE, R. (1959), "Migraine", *Brit. med. J.*, 1: 574.

HALPERN, L., BENTAL, E. (1958), "Epileptic Cephalgia", *Neurology (Minneap.)*, 8: 615.

HARRIS, W. (1926), "Neuritis and Neuralgia", Oxford University Press, London.

HARRIS, W. (1936), "Ciliary Neuralgia", *Brit. med. J.*, 1: 457.

HORTON, B. T. (1941), "The Use of Histamine in the Treatment of Specific Types of Headache", *J. Amer. med. Ass.*, 116: 377.

HUNTER, R. A., and ROSS, I. P. (1960), "Psychotherapy in Migraine", *Brit. med. J.*, 1: 1084.

KRANTZ, J. C., JUN., and CARR, C. J. (1951), "The Pharmacologic Principles of Medical Practice", Second Edition, Williams and Wilkins, Baltimore.

KUNKLE, E. C., PFEIFFER, J. B., JUN., WILHOIT, W. M., and HAMRICK, L. W., JUN. (1952), "Recurrent Brief Headache in 'Cluster' Pattern" *Trans. Amer. neurol. Ass.*, 77: 240.

MAIER, H. W. (1926), *Rev. neurol.*, 33: 1104; quoted by Krantz, J. C., and Carr, C. J., *loco citato*.

MERRITT, H. H., and FRIEDMAN, A. P. (1959), "Headache—Diagnosis and Treatment", Davis, Philadelphia.

RYAN, R. E. (1949), "Cafergone for Relief of Headache", *Postgrad. med. J.*, 5: 330.

SELBY, G., and LANCE, J. W. (1960), "Observations on 500 Cases of Migraine and Allied Vascular Headache", *J. Neurol. Neurosurg. Psychiat.*, 23: 23.

SYMONDS, C. P. (1956), "A Particular Variety of Headache", *Brain*, 79: 217.

A STUDY IN BLOOD DONOR MOTIVATION.

By EDITH PHILLIPS,

The Red Cross Blood Transfusion Service (Victorian Division), Melbourne.

ALTHOUGH the Red Cross Blood Transfusion Service in Australia depends entirely on voluntary contributions of blood by donors, and the supply at times lags behind the ever-increasing demands, there have been only a few attempts made to investigate the forces which either motivate people to offer their blood or, on the other hand, work as inhibiting factors against such an action.

A blood bank has become an essential part of a community's medical services and plays a vital role in saving lives and accelerating the return of patients to their ordinary activities and employment. Thus a well-stocked blood bank not only assures the survival of human beings, but also helps with their rehabilitation and thus influences the economy of the country beneficially.

The ultimate answer to the immediate availability of blood may lie in the development of storage methods and an adequate programme of stockpiling. But even then, just as now, a sufficient supply will be achieved only by the continuous, successful recruitment of new donors, and reliable panels of donors, who are prepared to make their precious contributions regularly.

It is the aim of this study, based on a survey conducted under the auspices of the Red Cross Blood Transfusion Service in Victoria in 1960, to investigate the forces which are at work for and against the donating of blood, and to find which methods of approach are most likely to succeed in future appeals for donors.

Method.

An anonymous *questionnaire* was devised to obtain personal data.

Victorian Red Cross Blood Transfusion Service.

CONFIDENTIAL QUESTIONNAIRE.

There is an urgent need for planned enrolment of voluntary blood donors. By completing and returning this questionnaire to the Blood Transfusion Service, you will greatly assist with a survey undertaken for this purpose.

Age ..... Educational Standard ....

Sex ..... Marital Status .....

Present Occupation ..... No. of Children (if any) ..

1. Are you a Blood Donor? .....
2. When did you give your last donation? .....
3. Is any member of your family a Blood Donor? .....
   Father.... Mother.... Others (specify relationship)....
4. What prompted you, and them, to become a donor? ....
5. What has brought the work of the Transfusion Service to your notice? Please number in order of influence:

T.V.	Posters	Hospital
Press	Friends	Anything else
Radio	Armed Services	

6. Have you or any member of your family suffered from a serious illness? If so, please state nature of illness.
7. Did you, or any member of your family receive a transfusion?
8. Blood can be donated safely every 3 months; please indicate your choice of the following:
   To be called upon (*a*) regularly every three months ...
   (*b*) at longer intervals .....
   (*c*) in emergencies only .....
9. Is it difficult for you to be a Blood Donor? .....
   If so, please state why .....
10. The Blood Transfusion Service finds it difficult to obtain an adequate number of Blood Donors. What do you think are the main reasons for people not becoming donors .....
11. Do you engage in community activities? If so, please state their nature .....

Questions number 1, 2, 3, 5 and 11 asked for "yes" or "no" answers, or the marking of a given choice, while questions number 4, 6, 7 and 9 were open-ended questions. Number 10 was worded in such a way that it gave the respondent a chance to project his views upon others, thus inviting a more honest approach.

We initially aimed to reach an unbiased sample of the population by using one chosen by the Australian Public

TABLE I.
Distribution and Collation of Questionnaires for Survey.

Place of Distribution of *Questionnaires.*	Number Distributed.	Answers Received.		Number Used for Punchcards.	
		Donors.	Non-donors.	Donors.	Non-donors.
Central bank	750 (27%)	246 (35%)	79 (17%)	242 (43%)	79 (35%)
Suburban mobile unit	480 (17%)	157 (23%)	61 (13%)	157 (27%)	61 (27%)
Country mobile unit	372 (13%)	124 (18%)	22 (5%)	124 (21%)	22 (10%)
University	421 (15%)	167 (24%)	254 (56%)	51 (9%)	51 (22%)
Gallup poll	770 (28%)	1 (<1%)	40 (9%)	—	13 (6%)
Total	2793 (100%)	695 (100%)	456 (100%)	574 (100%)	226 (100%)

Opinion Polls for one of their surveys in no way concerned with questions of blood donation. The interviewers of this organization kindly undertook the personal distribution of 770 *questionnaires* along with stamped, addressed envelopes for reply, but only 5% of the *questionnaires* were returned completed.

Knowing that our regular blood donors have a strong sense of identification with our service, it was then decided to seek their aid to obtain a more satisfactory response.

Each donor is issued with a serially numbered label on his arrival at the blood bank, the main portion of which is used subsequently to identify the donation. For a given period of time those donors whose label numbers ended in 5 or 0 were asked to answer our *questionnaire* themselves and have two others completed by non-donor friends of equivalent age, sex, marital and occupational status. This method was used at our central blood bank and on our suburban and country mobile collecting teams, the number distributed bearing some rough relationship to the intake of blood through these channels.

The regular visit of the mobile unit to the University of Melbourne in July, 1960, was made the occasion of a pilot run for the survey. Our university donors were matched with non-donors from the psychology school, who completed the *questionnaire* at the same time. In all 421 *questionnaires* were distributed on this occasion, and from these 51 matched pairs of donors and non-donors were selected for inclusion into the survey; again every fifth *questionnaire* was chosen. The reason for such a relatively high representation of student opinion in our sample stemmed from the hope that these young men and women, as potential future leaders of the community, would hand on the ideal of voluntary blood donation to those within their spheres of influence.

The 2000 *questionnaires* distributed by the method outlined above this time produced a much higher return (57·6%). Of the 1151 completed returns, 695 came from donors and 456 from non-donors. We arrived at a sample of 800 respondents after reducing the university quota to 51 and the Public Opinion Poll returns to 13 and excluding 45 for faulty responses.

The answers to each question were then classified, and up to 11 categories were created, thus ensuring that there was a category suitable for every answer. If more than one motive was given by the respondent, the first one was chosen for coding. All classification was done by myself. The results were then coded onto Hollerith cards for sorting and statistical analysis.

Results.

Table II illustrates the personal data of the respondents in answer to points preliminary to and inclusive of Question 1.

Answers to Question 2 ("When did you give your last donation?") show that out of 574 donors 419 (73%) gave their last donation within six months, a fact which ties in with the results received from Question 8 at a later stage.

Question 3 ("Is any member of your family a blood donor?") investigates the frequency of other members of the family being donors (Table III).

There is statistically a difference between the two groups with respect to other members of the family being involved. Donors tend to come from families in which other members give blood. The replies to Question 4 ("What has prompted you to become a donor?") were grouped into categories.

The important forces for the donating of blood come from a widespread wish to help (49%). Only 8% repay debts to the blood bank and only 6% invest for possible future needs of their own. Individual and group pressure will be discussed at a later stage.

Question 5 ("What has brought the work of the Blood Transfusion Service to your notice?") asked for preferential answers to 10 categories. For statistical purposes these were grouped into: (i) M.M. (mass media)—television, Press, radio, posters and films; (ii) I.P. (individual pressure)—hospitals, Red Cross or friends; (iii) G.P. (group pressure)—armed services or mobile unit visits.

TABLE II.
Personal Data of Respondents.[1]

	Donors.	Non-donors.	Total.
Age:			
18–30 years	217 (37·8%)	139 (61·5%)	356 (44·5%)
31–50 years	307 (53·5%)	78 (34·5%)	385 (48·1%)
Over 50 years	49 (8·5%)	9 (4·0%)	58 (7·3%)
Not answered	1 (0·2%)	—	1 (0·1%)
Sex:			
Male	400 (69·7%)	139 (61·5%)	539 (67·4%)
Female	174 (30·3%)	87 (38·5%)	261 (32·6%)
Marital status:			
Single	180 (31·4%)	107 (47·3%)	287 (35·9%)
Married	380 (66·2%)	111 (49·1%)	491 (61·4%)
Widowed	10 (1·7%)	3 (1·3%)	13 (1·6%)
Divorced	1 (0·2%)	1 (0·5%)	2 (0·2%)
Not answered	3 (0·5%)	4 (1·8%)	7 (0·9%)

[1] The total of 800 respondents is made up of 574 donors and 226 non-donors.

The statistical analysis of the returns to question 6 ("Have you or any member of your family suffered from a serious illness?") shows no significant difference between donors and non-donors.

Answers to question 7 ("Did you, or any member of your family receive a transfusion?") tend to show a significant difference between donors and non-donors. Donors belong to those people who tend to "repay".

Question 8 ("Blood can be donated safely every 3 months . . . ") asked for a choice between this period and longer intervals or emergencies only. As this attitude to regular blood donation is of the utmost importance to the blood bank the answers to this question were scrutinized from the occupational angle (Table VIII), and it was gratifying to see that the donors' vote for regularity was high in most categories (70% to 94%).

Question 9 asked "Is it difficult for you to be a Blood Donor?". The discussion of these personal difficulties with regard to the giving of blood brings different responses from donors and non-donors. Only 10% of all donors in our sample admit to such difficulties. These mainly blame

TABLE III.
Family Members Mentioned as Donors.

Table IIIA.
Number of Respondents with Donor Relatives.

	Father.	Mother.	Husband.	Wife.	Siblings.	Children.	Others.
Donors ..	35 (6%)	15 (3%)	24 (4%)	23 (4%)	59 (10%)	20 (3%)	4 (2%)
Non-donors ..	12 (5%)	11 (5%)	7 (3%)	2 (1%)	12 (5%)	3 (1%)	15 (8%)
Total ..	47 (6%)	26 (3%)	31 (4%)	25 (3%)	71 (9%)	23 (2%)	19 (4%)

TABLE IIIB.
χ^2 to Question 3.[1]

	Donors.		Non-donors.		Total.
	Observed Number.	Expected Number.	Observed Number.	Expected Number.	
Family	177	163·8	50	63·3	227
Others	394	407·3	171	157·7	565
Total	571	—	221	—	792

[1] $\chi^2=5·33$; d.f.=1; $P=0·02$; significant at the 0·05 level.

time (4%), place (1%) and responsibilities (1%). Of the non-donors 49% quote personal difficulties barring them from becoming donors, and it is mostly ill health (17%) which is blamed. Since the time factor could possibly lead to helpful changes in our appointment routine a further study was made of the eight occupational categories and the attitudes of their members to "time as an inhibiting factor".

Eleven *per centum* of professional workers and 7% of the self-employed respondents seem to be worried by the loss of time incurred by donating blood. They were followed by the students and by the unskilled workers.

TABLE IV.
Donor Motivation.

Categories.	Number.
Service to community	280 (49%)
Repayment	48 (8%)
Investment	36 (6%)
Individual pressure	70 (12%)
Group pressure	83 (15%)
Thanksgiving	20 (3%)
Headaches	—
Menopause	1 (<1%)
Nosebleeds	4 (1%)
Migraine	—
"Feel better"	5 (1%)
"Don't know"/not answered	27 (5%)
Total	574 (100%)

A further breakdown of difficulties experienced by donors and non-donors leads to a division into two groups —personal difficulties and expediency. Personal difficulties include age, ill health, after-effects, fear and hatred of injections; under expediency are included considerations of place, responsibilities, finance and time.

The statistical evaluation shows that the difference between donors and non-donors who do find personal difficulties is not significant, but that the donors tend to blame more outside and general reasons than personal ones.

Question 10 is worded in a projective way ("The Blood Transfusion Service finds it difficult to obtain an adequate number of Blood Donors. What do you think are the main reasons for people not becoming donors?"). The reluctance of people to become donors produced the

TABLE V.
Statistical Evaluation of Three Kinds of Forces.[1]

	Donors.		Non-donors.		Total.
	Observed Number.	Expected Number.	Observed Number.	Expected Number.	
Mass media ..	162	169·8	71	63·2	233
Individual pressure	315	313·4	115	116·6	430
Group pressure ..	85	78·7	23	29·3	108
Total ..	562	—	209	—	771

[1] $\chi^2=3·20$; d.f.=2; $P=0·2$; not significant.

greatest variety of interpretations from both donors and non-donors. These answers were again grouped into 11 categories.

It seems that fear is the most inhibiting factor for both donors and non-donors, to be followed only by ignorance and lack of motivation. These three main barriers were further scrutinized by a comparison of the reaction of respondents on different educational levels.

It still holds true that the highest percentage is given to fear of the unknown on primary and secondary educational levels, while on the tertiary level ignorance rates higher.

TABLE VI.
Illness in Donor and Non-donor Families.[1]

Illness Present.	Donors.		Non-donors.		Total.
	Observed Number.	Expected Number.	Observed Number.	Expected Number.	
Yes	146	143·1	53	55·9	199
No	425	427·9	170	167·1	595
Total ..	571	—	223	—	794

[1] $\chi^2=0·28$; d.f.=1; $P=0·50$; not significant.

Question 11 ("Do you engage in community activities?") produced responses which dispel the impression one might gain from daily contact with the donors—namely, the belief that the donors are more active in community activities than non-donors.

Discussion.

Quite obviously the danger of a volunteer bias has been present, even from the words "Red Cross" on the top of the *questionnaire*, not to mention the method of selecting non-donors through donors. We are aware of this fact and its implications on the statistical side of this study, and therefore we endeavoured to minimize the effects as much as possible.

As it appears from the personal data, 53·5% of our donors represented in this survey are within the age group of 31 to 50 years. Married people comprise 66·2%, and it could be stated here that the giving of blood is a responsible

act, often considered only at an age when responsibilities to family and community are accepted. The occupations of the respondents were listed in nine categories, the white-collar group being the highest represented (248), followed by skilled workers (154) and housewives (126).

The question of regularity of donations is of supreme importance to the blood bank, and it is most gratifying to see a strong tendency to such regular contribution from the answers to both Question 2 (the date of the last donation) and Question 8 (preference for three-monthly visits). Apart from the agricultural workers all other donor categories voted for regular visits (between 70% and 94%, Table VIII). The non-donors' replies seem

TABLE VII.

Transfusions in Donor and Non-donor Families.[1]

Transfusion Given to Family Member.	Donors.		Non-donors.		Total.
	Observed Number.	Expected Number.	Observed Number.	Expected Number.	
Yes	126	115·2	34	44·8	160
No	447	457·8	189	178·2	636
Total	573	—	223	—	796

[1] $\chi^2=4·51$; d.f.=1; $0·05>P>0·02$; significant at the 0·05 level.

similar, only that their lack of enthusiasm is expressed in much lower percentage figures (no higher than 46%). Amongst the non-donors the students are the only ones who show a preference for donating at longer intervals.

The very small number of both donors and non-donors who would be prepared to donate in emergencies only rather shows up the point that once the decision is made

TABLE VIII.

Attitude to Regularity of Donations.

Occupation.	Preference.				Total.
	Every Three Months.	Longer Intervals.	Emergencies Only.	"Don't Know"/ Not Answered.	
Professional:					
Donor	34 (83%)	7 (17%)	—	—	41 (100%)
Non-donor	10 (45%)	4 (18%)	7 (32%)	1 (5%)	22 (100%)
White-collar worker:					
Donor	155 (92%)	11 (7%)	2 (1%)	—	168 (100%)
Non-donor	34 (43%)	13 (16%)	11 (14%)	22 (27%)	80 (100%)
Self-employed:					
Donor	32 (71%)	11 (24%)	2 (5%)	—	45 (100%)
Non-donor	5 (46%)	3 (27%)	2 (18%)	1 (9%)	11 (100%)
Skilled worker:					
Donor	122 (94%)	6 (5%)	1 (1%)	—	129 (100%)
Non-donor	9 (36%)	2 (8%)	4 (16%)	10 (40%)	25 (100%)
Unskilled worker:					
Donor	18 (86%)	2 (9%)	—	1 (5%)	21 (100%)
Non-donor	—	—	—	—	—
Home duties:					
Donor	83 (92%)	4 (5%)	2 (2%)	1 (1%)	90 (100%)
Non-donor	13 (36%)	5 (14%)	1 (3%)	17 (47%)	36 (100%)
Agricultural worker:					
Donor	19 (51%)	17 (46%)	1 (3%)	—	37 (100%)
Non-donor	1 (25%)	1 (25%)	1 (25%)	1 (25%)	4 (100%)
Student:					
Donor	34 (79%)	8 (19%)	—	1 (2%)	43 (100%)
Non-donor	8 (18%)	20 (44%)	12 (27%)	5 (11%)	45 (100%)

to become a donor and the fear has been mastered, a repetition of the process is readily accepted. It seems therefore imperative for our recruitment policy not only to get the new donors, but also to indoctrinate them immediately with the importance of their regular contributions to the blood bank. A booster dose of enthusiasm may have to be applied at a certain further point, where statistics show a drop after five or six donations (Walsh and Clemens, 1956). At present we are conducting a reclamation drive for donors who have not kept their appointments within the last two years, although the mobile unit has visited their district regularly. The results of these "salvage" efforts are to be reported at a later date. It has been of interest to us to observe members of families coming in as donors, sometimes in groups, sometimes individually. On the mobile collection visits it is our policy to encourage mothers to bring their children along, and at evening sessions in the same setting, both parents may come along as donors if their children are welcome and the sitter problem is solved for them. It is only to be expected that a child who visits the blood bank in this fashion becomes familiar with the idea and the process of blood giving, and overcomes anxiety at an early stage. A repetition of the situation will certainly cope with deeper fears, and at

TABLE IX.

Time as an Inhibiting Factor in Different Occupations.

Occupation.	Total Number.	Number Claiming Time as Inhibiting Factor.
Professional	63	7 (11%)
White-collar worker	248	10 (4%)
Self-employed	56	4 (7%)
Skilled worker	154	5 (4%)
Unskilled worker	21	1 (5%)
Home duties	126	3 (2%)
Agricultural	41	1 (2%)
Students	88	4 (5%)

the age of 18 years the boy or girl is brought along for the first donation by a proud parent, or comes by himself as a matter of course. Frequently a son or daughter will replace a parent who has to give up regular contributions, and at other times different members of the family will rally to repay a debt to the blood bank. We now meet not only a second generation of donors, but also the grandchildren of the men and women who were the first donors in the early days of this service. We meet husbands and wives, often coming together, and we meet the young man and woman before their marriage.

TABLE X.

Difficulties in Being a Blood Donor.[1]

	Donors.		Non-donors.		Total.
	Observed Number.	Expected Number.	Observed Number.	Expected Number.	
Personal difficulties	13	18·2	56	50·8	69
Lack of expediency	27	21·8	56	61·2	83
Total	40	—	112	—	152

[1] $\chi^2=3·7$; d.f.=1; $0·10>P>0·05$, not significant.

Amongst brothers and sisters one can observe a certain amount of sibling rivalry ("The third has given the most"), but also a pride in common ideals ("All six of us are donors" or "Together we have given more than 50 pints"). The conscientious mother says "Every family should have a donor", and accepts it as her role. We meet all those who feel it is their duty to stock the blood bank so that they themselves and their families will be assured of this life-saving commodity if in need. In some countries this attitude is exploited for donor recruitment by assuring donors of priority in case of shortage.

Tables IIIA and IIIB show the representation of other donor members of the family amongst donors and non-donors, and the statistical evaluation by χ^2 shows a significance, inasmuch as donors seem to come from donor families.

It is of interest to note that 49% of our donor-respondents give their reasons for becoming donors under the rather general term of "service to the community". Apart from deeper, personal forces at which we cannot get by the means of a *questionnaire*, there seems to be a widespread wish to help fellow human beings.

Only 8% are repaying debts to the blood bank and only 6% invest for their own future needs.

Two other important forces prompting people to become donors come from group pressures (14%) and individual pressures (12%). The former comes to bear in the setting in which the first donation is given, such as the armed forces, national service and factories or institutions visited by the mobile units. On these occasions it is surprising how many people who might have remained potential donors all their lives actually come forward to give blood. They may have often thought of it previously and therefore the motivation has been present before, but it needs the pressure of the group to bring about the actual act of giving blood.

TABLE XI.
Inhibiting Factors in Donating Blood.

Reason Given.	Donors.	Non-donors.
Lack of motivation	115 (20%)	39 (17%)
Ignorance	122 (22%)	26 (11%)
Inconvenience	24 (4%)	15 (7%)
Fear of the unknown	138 (24%)	48 (21%)
Fear of needles	29 (5%)	7 (3%)
Fear of weakness	18 (3%)	15 (7%)
Unpleasant	2 (<1%)	5 (2%)
Conscientious objection	1 (<1%)	1 (<1%)
Resentment	1 (<1%)	2 (<1%)
Sight of blood	20 (4%)	6 (3%)
Lack of personal approach	22 (4%)	17 (8%)
"Don't know"/not answered	82 (14%)	45 (20%)
Total	574 (100%)	226 (100%)

It may be a prestige matter amongst friends, it may be the fear of isolating oneself by refusal or it may be to please the boss or a conglomerate of all these motivations which makes them volunteer. It is social pressure as well as a joint effort towards a socially valuable goal which becomes effective. The Junior Chamber of Commerce has adopted blood donation as its social service gesture for 1961. The members of a working-class mothers' club come to their local blood-collecting centre in a group; the first time it was as a birthday gift to the one mother amongst them who is a regular donor, but the next time they came converted to the value of their act and its relative ease. At factories, at the university and in prisons giving blood may be regarded as one way of breaking the daily monotony. This is jokingly admitted and accepted. However, when these donors at a later stage, having left the security of the group, present themselves individually as donors at the central bank and carry on with regular donations, the aim has been achieved, whatever the prime motivation.

TABLE XII.
Inhibiting Factors and Educational Levels.

Inhibiting Factor.	Educational Level.			
	Primary.	Secondary.	Tertiary.	Other.
Lack of motivation	59 (23%)	84 (21%)	11 (8%)	—
Ignorance	45 (18%)	86 (21%)	16 (11%)	1
Fear of the unknown	70 (28%)	103 (26%)	13 (9%)	—

The individual pressure comes mainly from a friend or relative, the sister at the hospital or the local Red Cross representative. This personal approach seems to be of great importance, and in the discussion of the reasons why people are reluctant to become donors, the lack of it is mentioned by 4% of the donors and by even more of the non-donors (7·5%).

Some respondents (4%) make their donation a gesture of thanksgiving for their own good health or success, and there is the odd case in which a donation is made the day before an engagement, marriage or eviction, which could be interpreted as an appeasement of the gods, or on the day before an examination, which may even be a preparation for failure.

A young woman who gave her first donation at a mobile centre after her spontaneous response to seeing the Red Cross van parked outside the hall, confided that she was looking for employment and getting rather desperate about it, and in making this impulsive gift, she hoped to change her luck. These occasional motivations for giving blood have the ring of the ancient blood sacrifice about them, inasmuch as a precious gift is offered in some relationship to wishes for the donor's own success and happiness, or the warding off of evil.

The physical reasons for donating blood are rarely admitted to, a few cures from nosebleeds (1%) and menopausal difficulties being mentioned, and 1% of the donors state that they are "feeling better". This may possibly be the case with hypertensives within the permissible limits, and also with those men and women who gain satisfaction from having done a positive act for another human being in need (Oeconomopoulos, 1958).

TABLE XIII.
Participation in Community Activities.[1]

	Donors.		Non-donors.		Total.
	Observed Number.	Expected Number.	Observed Number.	Expected Number.	
Yes	239	234·4	86	90·6	325
No	325	329·6	132	127·4	457
Total	564	—	218	—	782

[1] $\chi^2 = 0{\cdot}55$; d.f. = 1; $P > 0{\cdot}30$, not significant.

In the analysis of the media through which people hear about the work of the Blood Transfusion Service (Question 5), friends (33%) rank highest, and visits to hospitals take second place (15%); of the mass media used for publicity, posters lead (15%) and the Press (7·3%) follows, while radio and television are mentioned in only 3% of the replies. It must be stated here that at the time of the survey hardly any publicity on television or radio was being given, and that apart from some small posters distributed in places where the mobile unit called, only a few large posters of fairly old standing could be observed in the streets of Melbourne. However, the response to visual impressions seems to be acute, and it would therefore be reasonable to keep this in mind in planning future publicity.

From a classification of these forces into (i) mass media, (ii) individual pressure and (iii) group pressure, and a glance at donor and non-donor reaction to each of these, it appears that all three media have a similar impact on both donors and non-donors.

There does not seem to be any relationship between illness and the giving of blood, but there is a definite and significant relationship between the receiving and the giving of blood. Oeconomopoulos (1958) suggests that contact with sick people leads to a sense of guilt with respect to oneself, particularly if one is able to help them. It may be a cruel but strategically valuable moment to approach the family and friends of a patient about to receive a transfusion then and there, for replacement of the blood given.

A pledge signed under stress does not seem to be regarded as binding. In the Philippines, where the relatives have to collect the blood personally from the blood bank and where they are made to sign a pledge for replacement on this occasion, the actual redemption of the pledge amounts to only 7% to 10%. This is an interesting figure when compared with the 8% of donors on our sample who "repay". How more fully a "pay-back"

could be achieved would be a fascinating investigation well worth doing.

As it appears from Table IX, it is the professional man and the self-employed who value their time most highly, whilst neither the white-collar worker nor the skilled man—the two groups represented by the greatest number in our sample—is unduly worried by time, possibly owing to the fact that he is able to pay his visits to the blood bank in working hours, and incurs the loss of neither pay nor leisure time.

The reasons why "people" are reluctant to become donors are freely discussed by donors and non-donors alike. The donors may base their replies on the memory of fear and anxiety they have had to overcome themselves and expect others to feel the same way about it, and the non-donors do not have to rationalize and explain their own shortcomings, as they are not asked for their own personal reasons, but for a general statement.

Lack of motivation and ignorance lead with the donors, whilst fear in many forms tops both donor and non-donor answers. Fear is qualified as "fear of the unknown", "fear of needles", "fear of weakness", "fear of an unpleasant experience" and "fear of the sight of blood". Giving blood is giving away part of oneself—part of a most precious property—and the anxious questions we hear frequently from donors as to "How much do you take?" followed by "How much is there in the human body?" make it rather obvious that the donor's thoughts are occupied with a little arithmetic.

Dispelling these fears by the giving of information freely, by invitations to groups to visit the blood bank and mobile collecting centres, and by visual demonstrations—by television, by films or by demonstration—will have to be one of the main points of attack on this form of barrier against the donating of blood.

But there are deeper fears, based on the magic and mysterious role blood plays in primitive society, in which it represents life, power, strength, youth and eternal bonds.

Dichter (1952) has pointed towards unconscious anxieties connected with the thought of giving blood. It is trespassing into a forbidden area, where fate is taken into one's own hands and punishment can be expected. He describes a similarity between sacrifice, masochism and feminine submission, and states that all these are involved in the giving of blood. Blood has a very special place in people's unconscious mind, and it is no wonder there is a strong tendency to find excuses to escape from such a forbidding act. These emotional problems of potential donors will disappear only when superstition and anxieties can be overcome.

In daily contact with donors one is apt to get the impression that here is a group of people with a higher sense of responsibility towards their fellow men. Donors seem to be active in many other ways in helping others, either through organizations or individually. In our *questionnaire* we searched for an answer to this point, but we inquired only about participation in community activities. The statistical evaluation of the responses dispels these impressions, as there is no significant difference between the participation of donors and non-donors in community activities. However, through our daily contacts with the donors, particularly on the mobile unit, we observe many individual unrecorded acts of kindness on the part of these people, and never cease wondering at their readiness to help others.

Conclusion.

"For every person who is a blood donor there are three more who would be willing to donate regularly every three months." This is a finding of the Australian Public Opinion Polls after interviews with men and women under 60 years of age during 1960, independently of this survey (Melbourne *Herald*, October 6, 1960).

These donors could possibly be found if closer liaison could be adopted with government offices, large factories, business firms and institutions. The donors could be encouraged by the management's declared supportive policy, and their time could be paid for, whether they visited the central bank or the mobile unit was invited to the place of work.

Group pressure should be brought into play by the encouragement of the interest and support of clubs such as Rotary, Jaycees, Apex, Lions, The Returned Servicemen's League, the National Council of Women, The Housewives' Association and mothers' clubs, to name a few which combine the satisfaction of personal giving with a sense of community leadership, prestige and a feeling of responsibility for the cause.

The most fruitful media seem to be in the visual field, through television, films or posters; visits to the blood-collecting centres by groups should be fostered, to convince the potential donor of the informal and relaxed atmosphere under which blood can be collected, far removed from the tense aura of the hospital.

The individual pressure comes firstly from friends and secondly from siblings and peers. One should look for donors in one's own age group and social circle. The influence of parental or authoritarian example seems to be less effective. A more personal approach from doctors, sisters and Red-Cross personnel could make use of the softening-up process to which people are exposed when visiting hospitals. Further research could clear the situation as to how more fully "pay-backs" could be effected after transfusions.

Future donor recruitment programmes must be planned to tackle the three inhibiting barriers to the donating of blood—fear, lack of motivation and ignorance. Each one of these factors overlaps with the other, and any move attacking one of the three will also take care of some of the reluctance caused by the others.

Information programmes could dispel, if not the underlying primitive fear, at least the more superficial doubts as to the process of taking blood and its consequences for the donor. An appeal to people's sense of community responsibility can stress the ever-present need, which can easily develop into urgency and crisis, because of storage being limited by time. It may be necessary to undermine people's feeling of security to make them aware of certain responsibilities they cannot shirk. The slogan "if 'they' did not give, you might not live" may produce good results.

Finally, there is the one resentment voiced frequently by donors. It is a reference to the charges made for transfusions. We take care to explain that the blood received is a gift from an anonymous donor, and the fee charged covers its administration only. However, one still has the impression that there should be some form of acknowledgement of this gift by the medical profession, to show how much the donor's generosity is appreciated.

Acknowledgements.

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References.

DICHTER, E. (1952), "Some Attitudes Toward Blood Donating", University of Michigan, Survey Research Centre.

KEYNES, G. (1949), "Blood Transfusion".

OECONOMOPOULOS, C. T. (1956), "The Benign Psychosomatic Influence of Blood Donation on the Personality", "Proceedings of Sixth Congress of the International Society of Blood Transfusion".

WALSH, R. J., and CLEMENS, K. (1956), "A Survey of Some Voluntary Blood Donors in New South Wales", MED. J. AUST., 2: 205.

Reports of Cases.

EXTRASELLAR EXTENSION OF A PITUITARY ADENOMA AS A CAUSE OF THROMBOSIS OF THE INTERNAL CAROTID ARTERY.

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AFTER the publication of Sir Geoffrey Jefferson's classical paper in 1940 on the extrasellar extensions of pituitary adenomas, it has become possible to recognize the variations in symptomatology produced by these particular lesions, which previously had been limited to a rather conventional and didactic formulation.

Jefferson (1940) listed three main factors which control such extensions: first, and in his opinion the most important factor, "the innate urge of the adenoma to enlarge progressively and intermittently"; second, the state of fixation of the optic chiasm—normally prefixed or postfixed; and third, the shape of the pituitary fossa and the nature of its diaphragm.

He also described the pathways of spread of these extrasellar extensions—into the hypothalamus, the frontal and temporal lobes, the pharynx and the posterior cranial fossa, and outwards towards or into the cavernous sinus.

The attendant sequelæ of invasion of the cavernous sinus are oculomotor palsies, proptosis and trigeminal anæsthesia. Pressure on the wall of the sinus usually produces the same effects, without causing proptosis, but commonly involving the abducent nerve.

The internal carotid artery within the sinus is not commonly affected by the lateral spread of the adenoma, but this is a possible complication when the adenoma bulges into the sinus to envelope and compress the carotid artery (Dott, 1960). Such a consequence has not been noted previously.

Jefferson's paper, whilst emphasizing the variation in the size and direction of spread of pituitary adenomata, with their resultant syndromes, was written before cerebral angiography had become readily available in the evaluation of suspected intrasellar and suprasellar tumours. However, in recent years several detailed studies of the angiographic appearances of parasellar lesions have been made by a number of investigators, and of particular importance in this connexion is the paper by Money and Vanderfield (1955).

These authors discuss in detail the various angiographic appearances produced by intrasellar and suprasellar lesions, noting in particular the displacement of the major blood vessels produced by pituitary tumours, but they limit themselves to the general statement that when the tumour arises from the pituitary gland, inside or outside the sella, intratumour circulation is rarely seen. They do not cite any particular instance in which a pathological circulation pattern within a pituitary adenoma has been observed, nor has Bull (1960), in his extensive experience of cerebral angiography, encountered this event. Moreover, in a detailed survey of the available literature, no such specific example is recorded.

The present case is of unusual clinical and neuroradiological interest, in that it demonstrates a thrombosis of the internal carotid artery caused by an extension into the cavernous sinus of a pituitary adenoma, with the added sign of tumour circulation within the adenoma, which has not been observed heretofore.

Clinical Record.

The patient was a single man, aged 50 years, who was admitted to a neurosurgical unit on September 9, 1960. According to his sister he had always been a slow, dull fellow, and had retained his post as a clerk in a business office only because of a family relationship. His work had never been quite satisfactory.

He had enjoyed reasonably good health until 11 months previously; then, while attending a football match, he discovered a sudden numbness in his left hand which persisted in spite of his rubbing it with the other, and he later had difficulty in standing up and walking home. On awakening the next day, he complained of headache and dizziness and noticed that his left leg was weak. These symptoms cleared after a few days, and except for an occasional feeling of numbness of his left leg, he remained well.

In June, 1960, four months before his admission to hospital, he became ill in an indefinite sort of way; he was irritable, showed a distaste for company and was easily exhausted. He had several bouts of profuse epistaxis, usually following a severe right frontal headache. He also complained of occasional attacks of severe neuralgic pain over his right cheek and upper gum.

One day before his admission to hospital, whilst having his evening meal, he suddenly felt ill and dizzy, and got up to go to the bathroom. His sister then heard him fall and found him lying unconscious on the floor; he did not appear to have had a major fit. A few minutes later he was able, with assistance, to walk to his bed, but later complained of dysæsthesiæ of his left arm, left leg and face.

In answer to inquiries he admitted that for some time past he had been sexually apathetic, whereas previously he had had erections nearly every morning. For the past several years he had needed to shave only once weekly. He denied any previous disturbance of vision, and further inquiries about his endocrine status all produced negative replies.

On examination, he was of small stature and female habitus, having a female type of obesity, with plumpness of his abdomen, hips and thighs. His weight was 140 lb. (64 kg.), and there was slight prominence of his breasts. His height was 59·5 in., his span was 60·5 in. and the crown-to-pelvis measurement was 31·5 in. (Figure 1A).

The skin was fine and dry, and without lustre, and his face was covered in fine wrinkles. The external genitalia were below normal in size; the testes were small and soft in consistency. The pubic hair was scanty, and both axillæ were hairless and devoid of sweat or sebaceous secretion. Mentally he was lethargic, and his answers were slow, although apparently correct.

Both discs were normal, as were the retinal vessels. The visual acuity was 6/9 on both right and left sides. The visual fields (measured by confrontation) showed a definite left homonymous hemianopia, fairly congruous in size and shape. His ocular movements were full, and diplopia, squint and paralytic ptosis were absent; there was a slight suggestion of proptosis of the right eye. The pupils were central and equal and reacted to light and convergence.

There was some anæsthesia in the distribution of the first and second divisions of the right trigeminus and the right corneal reflex was depressed. The remaining cranial nerve function was intact apart from a slight left lower facial weakness.

For the rest, there was a slight left hemiparesis with corresponding reflex changes. Sensibility to light touch

and pin-prick, tactile discrimination and stereognosis were normal on both sides. However, tactile localization was faulty in the fingers of his left hand.

The temperature was normal. The blood pressure was 140/85 mm. of mercury.

The hæmoglobin level was 10·8 grammes per 100 ml., and the white-cell count 9900 per cubic millimetre, with a normal differential count. The urine had a specific gravity of 1·021 and a pH of 4·3 and contained a trace of protein, and gave a negative response to tests for sugar.

A lumbar puncture performed on his admission to hospital produced clear, colourless fluid, containing six lymphocytes per cubic millimetre and 125 mg. per 100 ml. of protein. The Wassermann reaction was negative in the cerebro-spinal fluid and the blood. The pressure of the cerebro-spinal fluid was not recorded. X-ray examination of the skull showed the pituitary fossa to be enlarged, with depression of the floor and erosion of the dorsum seliæ (Figure IIA[1]).

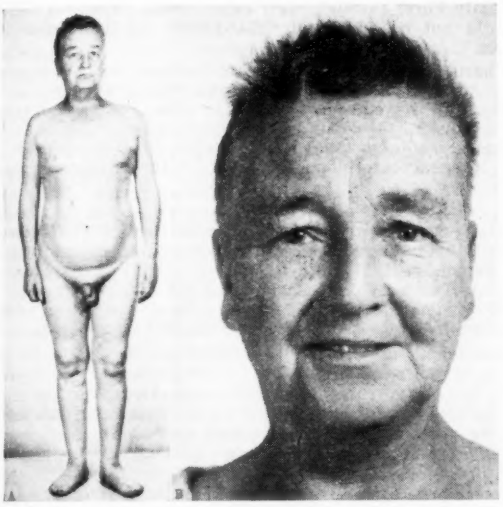

FIGURE IA: Photograph of patient showing female type of obesity, prominence of breasts, absence of body hair and underdeveloped genitalia. FIGURE IB: Note slight proptosis and pituitary type of facies.

The diagnosis now gave rise to a certain amount of difficulty. It was clear enough that this patient had a chiasmal lesion, but the most arresting and puzzling features of the case were the previous episodes of left-sided dysæsthesiæ and weakness and the present complaint of the sudden left hemianopia with associated left-sided hemiparesis.

It was therefore decided to perform a right carotid angiogram, in order to obtain the fullest possible information about the precise situation and size of the lesion so that, if necessary, the most appropriate neurosurgical technique might be employed. Four days after his admission to hospital, a percutaneous right carotid angiogram was made; 10 ml. of a 60% solution of "Urografin" were injected into the right common carotid artery.

The lateral series of X-ray films showed a complete occlusion of the right internal carotid artery immediately after it emerged from the cavernous sinus (Figure IIIA). An abnormal collection of vessels was observed overlying the pituitary fossa (Figures IIIB and IIIC), which was supplied from an artery rising from the intracavernous portion of the internal carotid artery.

[1] For Figures II to IV see art-paper supplement.

In the antero-posterior series the abnormal group of vessels is clearly shown to be in the mid-line, and therefore situated in the pituitary fossa (Figure vbg ½wtad"cm

A left carotid angiogram was prepared at the same time, and this showed the bifurcation of the internal carotid artery to be elevated (Figure IIc). A good collateral circulation via the anterior communicating artery is seen (Figure IIB).

In the two weeks after his admission to hospital the patient made steady progress; there was a satisfactory return of motor power to his left arm and leg and an almost complete regression in the defect in his left homonymous field.

It was clear that the occlusion of his right internal carotid artery had diminished critically the total blood flow to his brain, as he had had two previous episodes of failure of the collateral cerebral circulation. This naturally contraindicated radical therapy.

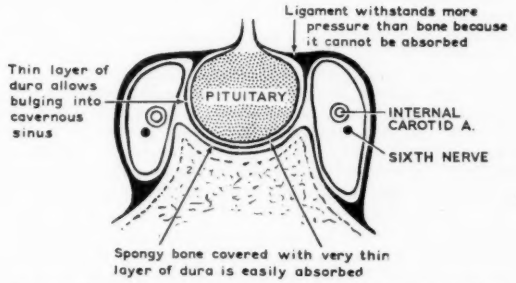
Ligament withstands more pressure than bone because it cannot be absorbed
Thin layer of dura allows bulging into cavernous sinus
PITUITARY
INTERNAL CAROTID A.
SIXTH NERVE
Spongy bone covered with very thin layer of dura is easily absorbed

FIGURE V: Schematic drawing to illustrate how a pituitary adenoma manages to extend into the cavernous sinus and the relationship of the internal carotid artery. (Modified after Jefferson.)

During the course of his convalescence a number of investigations were performed to evaluate the alterations in his endocrine function coincident to the pituitary adenoma; this was done so as to assess better the appropriate form of replacement therapy he would require. The results of these investigations are as follows. The urinary gonadotrophin levels were estimated according to the method of Loraine and Brown (1954) and none were detected. The 17-ketosteroid excretion was 4·2 mg. per 24 hours; the 17-hydroxycorticoid excretion was 10·8 mg. per 24 hours; after an intravenous injection of ACTH a characteristic twofold increase in the total corticoid output occurred. The protein-bound iodine level was 6·1 μg. per 100 ml. The basal metabolic rate was +1%. The serum cholesterol level was 265 mg. per 100 ml. and the fasting blood sugar level was 85 mg. per 100 ml. The serum inorganic phosphorus level was 4·6 mg. per 100 ml. and the serum calcium level was 10·5 mg. per 100 ml. The urine specific gravity was 1020; no abnormal constituents were found. A sex chromosome study revealed a normal male pattern.

An electrocardiogram was within normal limits, but the electroencephalogram was of interest in that the resting record showed a sparse occipital alpha rhythm of 8 cycles per second. However, there was a preponderance of 5 to 6 cycles per second activity anteriorly. A subsequent electroencephalogram obtained one month later, after treatment with cortisone, a small dose of thyroid extract and methyl testosterone, showed a well-defined alpha rhythm which was now faster (8 to 9 cycles per second), and there was no appreciable theta activity anteriorly.

Discussion.

There are several points of particular interest in the semeiology of this case.

Firstly, the transient attack of left-sided weakness, which was preceded in the immediate prehemiparetic phase by dysæsthesiæ of the left arm and the face 11

months previously, was presumably due to occlusion of the right internal carotid artery at the level of the cavernous sinus.

The two subsequent attacks, both of which were fairly stereotyped and both clearly ischæmic in origin, would suggest that the most likely explanation for repeated transient episodes of paresis in cases of obstruction to the internal carotid artery is the one put forward by Denny-Brown (1951), who postulated that these episodes represent a cerebral hæmodynamic crisis — when the cerebral blood flow is unable to meet the metabolic requirements of the brain during physiological stress.

If, as it can be reasonably supposed, the obstruction to the right internal carotid artery developed gradually as a result of the pituitary tumour extending into the cavernous sinus to envelop the carotid artery, it is probable that collateral channels through the anterior communicating artery become effective (Figure IIB).

Furthermore, as the site of obstruction in this case was proximal to the right ophthalmic artery, it is reasonable to assume that anastomoses between branches of the external carotid artery and the right ophthalmic artery in the orbit provided an additional channel for which blood flowing in a direction the reverse of normal could enter the right internal carotid artery above the block, and supply the middle cerebral artery of the affected hemisphere. That these factors are operative when internal carotid artery occlusion develops gradually from disease has been demonstrated by Christophe and Thiry (1955).

Secondly, this case reports the sudden loss of vision in the left homonymous fields, which can be regarded as direct consequence of the extrasellar extension of the pituitary tumour to involve the carotid artery in the cavernous sinus. Whilst the complaint of extremely rapid loss of vision has been noted in cases of hypophyseal enlargement, it usually occurs on the basis of hæmorrhage within the tumour and is described as affecting one eye only, though the visual fields in both eyes are usually involved (Walsh, 1947).

De Schweinitz (1923) studied the irregular defects which occurred in pituitary tumours and noted that the differences in these defects depended upon the relationship that exists between the optic pathways and the expanding pituitary lesion—the nature of the enlargement of the pituitary both in amount and direction disturbing this relationship. Another explanation generally overlooked to explain unusual defects in vision caused by pituitary adenomas is the effect of pressure by the anterior cerebral and anterior communicating arteries on the optic chiasm and optic nerves (Kernohan and Sayre, 1956).

However, it is known that attacks of transient blindness occur with gradual occlusion of the internal carotid artery (Symonds, 1957).

The present observation leads to a consideration that an alternative explanation for rapid loss of vision with atypical field defects in cases of hypophyseal tumours is that the tumour has extended laterally to implicate the adjacent internal carotid artery. Here it is worth mentioning that the proportion of pituitary tumours which involve the cavernous sinus is in the region of 5% (Jefferson, 1960).

A third and unique feature in the study of this case is the angiographic demonstration of pathological tumour circulation within the pituitary tumour—a radiological sign that has not been previously reported.

Moniz (1940) studied the angiographic appearances of intracranial tumours in relationship to their histology and found that different types of intracranial tumours have different vascular patterns. Whilst his account makes no mention of pituitary tumours as such, he noted a correlation between the vessel changes, the rate of circulation in these pathological vessels and the proliferation of the tumour cells—a correlation which bore some indication of the degree of malignancy of the tumour.

Unfortunately no biopsy material of this tumour was available for study, though the histological features of these lesions have been carefully studied by Dott and Bailey (1925) and Bailey (1932), who recognize three types of pituitary tumours sufficient in size to produce changes in the sella turcica—chromophobe, eosinophil and transitional or mixed types. It is with the chromophobe or possibly the transitional form that we are mainly now concerned, as all the clinical and biochemical evidence is directed against the eosinophil type of adenoma. According to Bailey, the elongated cells of the chromophobe adenomas tend to radiate around the vascular supply of the gland. Blood vessels are abundant, and between them are often found septa of dividing connective tissue. Dott and Bailey did not note mitoses in these tumours, nor is there any evidence to suggest that this lesion had undergone malignant change. Whilst Jefferson (1940) used the term "malignant" for those large adenomas which had actually burst through their capsule and expanded widely, he did not use the term "malignant" in the histological sense.

There is some reason thus to believe that an explanation for the intrapituitary angiographic appearances is that they have been caused by the contrast medium collecting in these sinusoids (*vide supra*), and that the picture has been thrown into relief by the occlusion of the internal carotid at the level of the cavernous sinus.

Summary.

The pathological features of occlusion of the internal carotid artery have been fully discussed in recent reviews by Symonds (1957) and Greenfield (1958). The cause of the obstruction is usually atherosclerotic, but it may be syphilitic or embolic in origin. Other and rarer causes include trauma, giant-cell arteritis and blood diseases.

Neoplasms may cause narrowing of the vessel in the neck, in the skull or within the cranium. In the present case, the site of the obstruction was in the cavernous sinus owing to an extrasellar extension of a pituitary adenoma; during the course of investigation by carotid angiography an abnormal vascular pattern was shown within the pituitary adenoma. Neither of these conditions has been described heretofore and their clinical and radiological significance is discussed.

Acknowledgements.

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References.

BAILEY, P. (1932), "Tumours of the Hypophysis Cerebri in Cytology and Cellular Pathology of the Nervous System", edited by Wilder Penfield, Paul Hoeber, New York: 1133.

BULL, J. W. D. (1960), personal communication.

CHRISTOPHE, L., and THIRY, S. (1955), *"Thrombose de la carotide interne; suppléance par l'artère ophtalmique", Neuro-chirurgie,* 1: 110.

DENNY-BROWN, D. (1951), "Symposium on Specific Methods of Treatment: Treatment of Recurrent Cerebrovascular Symptoms and Question of 'Vasospasm'", *Med. Clin. N. Amer.,* 35: 1457.

DE SCHWEINITZ, G. E. (1923), "Concerning Certain Ocular Aspects of Pituitary Body Disorders Mainly Exclusive of the Usual Central and Peripheral Hemiopic Field (Bowman Lecture)", *Trans. ophth. Soc. U.K.,* 43: 12.

DOTT, N. M., and BAILEY, P. (1925), "A Consideration of the Hypophysial Adenomata", *Brit. J. Surg.,* 13: 314.

DOTT, N. M. (1960), personal communication.

GREENFIELD, J. G. (1958), "Neuropathology", Arnold, London.

JEFFERSON, G. (1960), "Selected Papers", Pitman Medical Publishing Company.

JEFFERSON, G. (1940), "Extra Sellar Extension of Pituitary Adenomas", *Proc. roy. Soc. Med.,* 33: 433.

KERNOHAN, J. W., and SAYRE, G. P. (1956), "Tumours of Pituitary Gland and Infundibulum", Armed Forces Institute of Pathology, Washington, D.C., Section X, Fascicle 36.

MONEY, R. A., and VANDERFIELD, G. K. (1955), "Angiography in the Management of Intra and Suprasellar Tumours", *J. Neurosurg.*, 12: 203.

MONIZ, E. (1940), *"Die cerebrale Arteriographie und Phlebographie"*, Springer, Berlin, 8: 413.

SYMONDS, C. P. (1957), "Occlusion of the Internal Carotid Artery", "Modern Trends in Neurology", Second Series, edited by D. Williams, Butterworth.

WALSH, F. B. (1947), "Clinical Neurophthalmology", Williams and Wilkins.

LOCALIZED PLEURAL MESOTHELIOMA.

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LOCALIZED connective tissue growths of the pleura are called either localized plèural mesotheliomas, fibromas of the pleura or pleural fibrosarcomas. They often present a distinctive syndrome which may allow a correct diagnosis to be made before operation. The condition is important because of the good results that follow recognition and removal of the tumour, even when the histological pattern appears to be malignant and even when local extensions are present.

The following is an account of two cases of localized pleural neoplasm treated at the Royal North Shore Hospital of Sydney in the past six years. Both illustrate the typical syndrome of pleural mesothelioma.

Case I.

An ex-serviceman, aged 46 years, first complained of polyarthralgia of some months' duration in March, 1954. His ankles, knees and hands were involved by painful symmetrical swellings initially resembling rheumatoid arthritis. An X-ray film of his chest taken at this time was said to be normal. Later in 1954 he noticed that his elbows were involved in this arthritis. In January, 1955, it was found that he had a raised erythrocyte sedimentation rate and he was referred to a cardiologist with a diagnosis of subacute rheumatic fever. He then received salicyclate therapy, but found that his disability was increasing, even with treatment. Early in 1955 he first noticed clubbing of the fingers, and in March, 1955, he first noticed a pain in the right lower part of the chest which became steadily worse over the succeeding months. A further X-ray film of the chest was taken, which showed an opacity situated posteriorly in the right lower zone of the chest (Figure I[1]). The radiologist's report stated that the opacity might well be a pleural growth rather than an intrapulmonary mass.

The patient was admitted to the thoracic unit of the Royal North Shore Hospital in December, 1955, 20 months after the onset of symptoms. Examination of the chest revealed signs consistent with the presence of a mass at the right base posteriorly. In addition there was grade IV clubbing of the fingers and toes with associated enlargement of the soft tissues of the terminal phalanges and swelling and limitation of movement of all the affected joints. Radiological examination of the long bones showed periosteal proliferation typical of hypertrophic osteoarthropathy (Figure II). Bronchoscopy was carried out under local anæsthesia and no endobronchial or other abnormality was found.

On January 10, 1956, a right postero-lateral thoracotomy was performed. The lower lobe of the right lung was compressed by a large oval mass which was attached to the lower surface of the lobe by numerous bands, one of which was richly supplied with blood vessels. The tumour was situated beneath the visceral pleura of the lobe. There was a small nodule present on the parietal pleura against which the tumour had rested; otherwise the pleural cavity was clear. The lower lobe of the right lung was removed, together with the tumour, and the nodule on the parietal pleura was removed for histological examination. Recovery from operation was uneventful and the patient was discharged on the thirteenth day after thoracotomy.

The tumour weighed 1125 grammes and measured 17 by 11·5 by 7·5 cm. Histologically it had the structure of a fibrosarcoma with varying degrees of maturity apparent in different areas of the growth. The pleural nodule was also a fibrosarcoma of more malignant structure than its parent tumour.

After his discharge from hospital the patient received radiotherapy (between 4500*r* and 5500*r* over three months) to the right side of his chest. He has been followed now for five years and has remained well. His arthralgia disappeared immediately after operation and has not recurred, and there has been no other evidence of local or distant extension or recurrence of his tumour.

Case II.

The patient was a woman, aged 61 years, who had never had her chest examined radiologically prior to this illness. She was admitted to hospital in March, 1961, with a five-months' history of progressively worsening arthralgia and stiffness in her knees, ankles, elbows and interphalangeal joints. Her fingers and hands had perspired excessively during this period and she had also noticed tiredness, anorexia and vague ill health.

Her local practitioner recognized that she had severe hypertrophic osteoarthropathy. He recommended radiological examination of the chest and then referred her to the Royal North Shore Hospital. On examination she had grade IV bilateral clubbing of fingers and toes, with drum-stick enlargement of the terminal phalanges. There were warmth, swelling and limitation of movement of the knees, ankles, and terminal interphalangeal joints. She also had signs of dullness and diminished air entry at the left lung base posteriorly, and her apex beat was not palpable. X-ray films of her chest (Figure III) showed an irregularly shaped opacity situated in the left lower part of the chest. There was marked displacement of the mediastinum to the right, and transvere decubitus X-ray films confirmed the suspicion that the opacity was more likely to represent an extrapulmonary tumour than a large pleural effusion. X-ray films of the long bones revealed widespread symmetrical lamellated periosteitis typical of hypertrophic osteoarthropathy.

Before operation the possibility of a pleural tumour was considered because of the complete absence of specific pulmonary symptoms in the presence of such a large mass and such a degree of hypertrophic osteoarthropathy.

Thoracotomy was performed on April 6, 1961, through a left postero-lateral incision. A large, white tumour was present, which arose subpleuraly from the collapsed lower lobe of the left lung. The tumour resembled a giant uterine fibroid (Figure IV) and weighed 2215 grammes. It appeared to arise from beneath the visceral pleura. A left lower lobectomy was performed and the tumour was removed with the lobe. Several small nodules were present on the parietal pleura opposite the site of the growth. One of these was removed for examination and the remainder were coagulated by diathermy. The parent tumour and the pleural nodule were both seen to be fibrosarcomas on histological examination.

After operation the patient experienced sudden and marked relief from her arthralgia. She denied any joint pain within half an hour of operation before she received her first post-operative dose of analgesic. The deformity of her joints lessened, and before her discharge from hospital she was able for the first time in months to close her hands. Her post-operative course was uneventful and she was discharged on April 22 — 16 days after thoracotomy. It is still too soon to report on her subsequent course.

[1]For Figures I to IV see art-paper supplement.

Discussion.

Primary neoplasms of the pleura are rare, but the condition has now been reported often enough for a distinctive clinical picture to emerge. This is seen in two-thirds of the cases. In the other third the symptoms are non-specific and do not help the clinician to differentiate these tumours from other intrapulmonary masses. In all cases thoracotomy is necessary to confirm or establish the diagnosis.

The typical picture has been described by Claggett *et alii* (1952) and by Price-Thomas and Drew (1953). Females are more commonly affected than males and the disease is commonest in the sixth decade. The average age of the 24 patients reported from the Mayo Clinic by Claggett *et alii* was 50 years, while all those described by Price-Thomas were over the age of 55 years.

The symptoms initially are extrathoracic. The patients present with clubbing and hypertrophic osteoarthropathy in many instances. Often it is the severity of the hypertrophic osteoarthropathy that causes the patient to seek help and leads to radiological examination of the chest. Claggett pointed out that sometimes the arthritis is indistinguishable from rheumatoid arthritis, and there is often delay in establishing the diagnosis of pulmonary neoplasm in these cases. The first patient discussed in this report presented initially with this type of arthritis, but later developed obvious hypertrophic osteoarthropathy.

Price-Thomas pointed out that when clubbing and joint involvement are absent, the growth is likely to be small. He also stated that recurrence of the tumour after operation is often followed by return of the joint symptoms. Benoit and Ackerman (1953) agree that hypertrophic osteoarthropathy is associated with large pleural tumours. The cause of this syndrome is still not certain, but it may be related to precapillary anastomoses between the bronchial and peripheral pulmonary arteries as suggested by Cudkowicz and Armstrong (1953). It has been shown that these anastomoses are more numerous in the lung near a pulmonary tumour, and blood with a higher oxygen saturation has been obtained from diseased areas of the lung. Hall (1959) suggested instead that the passage of reduced ferritin unchanged through the lung via pulmonary arterio-venous shunts might be the cause of hypertrophic osteoarthropathy.

Other symptoms are due to the presence of a mass. Indeed, Stephanopoulos and Catsaras (1959) believe that dyspnœa, chest pain or symptoms following collapse of a lobe are more typical of this disease than joint manifestations. In neither case described in this report were pulmonary symptoms outstanding.

X-ray films of the chest in a typical case show a localized intrathoracic mass often related to the lower lobe. The mass is frequently larger than the symptoms would lead one to suspect. The tumours may also be found in the interlobar fissures, and in this situation there may be endoscopic evidence of extraluminal bronchial obstruction.

The association of hypertrophic osteoarthropathy and a large, localized intrathoracic mass is suspicious of pleural mesothelioma. This clinical association is not shared with bronchial carcinoma. Claggett stated that in 2000 consecutive patients with bronchial carcinoma examined at the Mayo Clinic only four had obvious hypertrophic osteoarthropathy; Semple *et alii* (1955) and Jack (1952) put the incidence of osteoarthropathy at less than 3% in cases of bronchial carcinoma. Price-Thomas pointed out that no lesion was as constantly associated with these joint manifestations as pleural mesothelioma. Once suspicion is aroused then thoracotomy is mandatory. Age is seldom a bar to surgery and diminished respiratory reserve due to the tumour is a pre-operative hazard only.

Joint symptoms disappear promptly after thoracotomy. The two cases described here are interesting in that the osteoarthropathy disappeared, even though proven local extensions of the tumour remained in the chest after operation. One patient has remained free from joint symptoms and recurrences for five years so far.

These growths have been called fibromas or fibrosarcomas, but even when the histological picture is that of a highly malignant sarcoma they behave like benign growths. It is widely held that these growths are mesotheliomas — that is, that they originate from the layer of mesenchymal cells situated beneath the pleura. Tissue-culture experiments carried out by Stout and Murray (1942) showed that growths with typical sarcomatous patterns can be grown from multipotent mesenchyme. Duhig (1959) described a solitary rhabdomyosarcoma arising from the same subpleural tissue layer and behaving in the same benign fashion as other pleural mesotheliomas.

The prognosis is good in these cases after the primary tumour is removed. Claggett reported a 25% recurrence rate in the Mayo Clinic series, which extended in some cases over 20 years. Three of his patients (12%) died—two as a result of local recurrence and one with distant metastases. Only one of his patients died within five years. Price-Thomas was forced to remove the remaining lobe of a lung in which a local recurrence appeared one year after operation, but the patient has remained well since then. This report describes one patient with known local extensions who is well after five years.

The condition of diffuse pleural mesothelioma is regarded by some as a variant of the localized type of tumour. However, this is very malignant with a rapid course. Its clinical features are different from those described above, and Price-Thomas has emphasized that localized pleural mesothelioma has no relation macroscopically, microscopically, clinically or prognostically with this diffuse malignant type of growth.

Summary.

1. Two cases of localized pleural mesothelioma are reported.

2. The typical syndrome is described and the incidence of hypertrophic osteoarthropathy is emphasized.

3. Hypertrophic osteoarthropathy disappears rapidly after removal of the tumour, even when proven local extensions of the tumour remain in the chest.

4. The prognosis is favourable whatever the histological picture.

5. Localized pleural mesothelioma has no relation to diffuse pleural mesothelioma, which is a highly malignant condition.

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References.

BENOIT, H. W., JUN., and ACKERMAN, L. V. (1953), "Solitary Pleural Mesothelioma", *J. thorac. Surg.*, 25: 346.

CLAGGETT, O. T., MCDONALD, J. R., and SCHMIDT, H. W. (1952), "Localised Fibrous Mesothelioma of the Pleura", *J. thorac. Surg.*, 24: 213.

CUDKOWICZ, L., and ARMSTRONG, J. B. (1953), "Finger Clubbing and Changes in Bronchial Circulation", *Brit. J. Tuberc.*, 47: 227.

DUHIG, J. T. (1959), "Solitary Rhabdomyosarcoma of the Pleura", *J. thorac. Surg.*, 37: 236.

HALL, G. H. (1959), "Cause of Digital Clubbing", *Lancet*, 1: 750.

HALL, G. H. (1959), "Causes of Clubbing", *Lancet*, 1: 1151.

JACK, G. D. (1952-1953), "Bronchogenic Carcinoma", *Trans. med.-chir. Soc. Edin.*, 11: 70.

SEMPLE, T., and MCCLUSKIE, R. A. (1955), "Generalised Hypertrophic Osteoarthropathy in Association with Bronchial Carcinoma", *Brit. med. J.*, 1: 754.

STEPHANOPOULOS, K., and CATSARAS, H. C. (1959), "Pleural Mesotheliomas", *Amer. J. Surg.*, 97: 360.

STOUT, A. P., and MURRAY, M. R. (1942), "Localised Pleural Mesotheliomas", *Arch. Path.*, 34: 951.

THOMAS, C. P., and DREW, C. E. (1953), "Fibroma of Visceral Pleura", *Thorax*, 8: 180.

THALASSÆMIA MAJOR IN NEW GUINEA.

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UNTIL recently, it was believed that thalassæmia did not exist in New Guinea. As far as is known, the first reported example of thalassæmia major in a Papuan was described recently (Ryan, 1961). Because of some unusual features in her case, to which reference will be made subsequently, it was considered advisable to report the following three cases occurring in Papuan children. It will be seen that in these latter cases the disease did not differ greatly from that described elsewhere (Cooley and Lee, 1925; Minnich *et alii*, 1954; Wintrobe, 1956), although the diagnosis in two was delayed, owing either to an aplastic crisis, or to the suppressive effect of numerous transfusions on endogenous erythropoiesis.

Methods.

Routine hæmatological and other investigations were carried out in the pathology department of the General Hospital, Port Moresby. Oxalated blood samples were dispatched by air to Perth, Western Australia, for hæmoglobin electrophoresis, which was carried out on cellulose acetate strips. Also hæmoglobin electrophoresis by starch block was done in Cases II, III and IV. Alkali denaturation tests were performed by the method of Singer *et alii* (1951). The electrophoretic and alkali denaturation results in Cases II and III were checked at the Calcutta School of Tropical Medicine by Professor J. B. Chatterjea, who, in fact, first demonstrated the presence of excess hæmoglobin F in Case III. Blood and bone-marrow films were fixed in methanol and also dispatched to Perth, where they were stained with Grunwald-May-Giemsa stain at pH 6·8.

Blood for glucose-6-phosphate-dehydrogenase (G6PD) estimation was collected into heparin and dispatched by air to Melbourne, arriving on the same day. The estimation of the enzyme was performed as soon as possible after arrival.

Blood volume was calculated as approximately 30 ml. per pound of body weight, and the rise of hæmoglobin value following transfusion was expected to be about equal to the percentage of blood volume injected (Newman, 1959).

The establishment of the diagnosis was based clinically on the presence of pallor, hepatosplenomegaly, retarded development, mongoloid facies and recurrent pyrexia. A hypochromic microcytic anæmia, with normoblasts in the peripheral blood and anisocytosis and poikilocytosis, was present in all cases. At some stage, the bone marrow showed pronounced erythroid hyperplasia with normoblastic proliferation in all, and excess of fœtal hæmoglobin was present in the blood in each case. All patients showed the typical radiological changes in the bones.

Case I.

A male child, aged three years, born in the Oro Bay district, was admitted to hospital on August 27, 1960, with a history of anæmia from the age of three or four months. The anæmia had been unresponsive to oral and parenteral administration of iron and folic acid, and after the child's admission to hospital showed no response to cortisone. At least seven or eight blood transfusions had been given at a district hospital, the last one four months previously. Two brothers had died at the ages of one and two years of unknown disease. Two brothers and two sisters were alive and well, as were also both parents.

On examination, the patient was noted to be undersized (weight 23 lb.) and pale, with protuberant abdomen and mongoloid facies, and with pronounced frontal and parietal bossing. The spleen was enlarged to the level of the umbilicus, and the liver to three fingers' breadth below the right costal margin. A hæmatological examination gave the following results. The hæmoglobin value was 4 grammes per 100 ml., the erythrocytes numbered 1,960,000 per cubic millimetre, the hæmatocrit was 13%, the mean corpuscular hæmoglobin concentration was 31%, the mean corpuscular volume was 65 c.μ and nucleated erythrocytes numbered 2200 per cubic millimetre. The leucocytes numbered 9900 per cubic millimetre. Reticulocytes numbered 16%. Examination of the blood smear showed anisocytosis, poikilocytosis and polychromasia. The serum bilirubin level was 0·8 mg. per 100 ml. Examination of the marrow smear showed erythroid hyperplasia, with the presence of large numbers of normoblasts. The mature red cells showed pronounced morphological abnormalities, the typical cell being larger and thinner than normal, and target cells were present. Many showed Howell-Jolly bodies, and fragmented forms were common. The blood group was A, Rh-positive. The alkali denaturation test showed 46% undenatured hæmoglobin. Electrophoresis showed a major hæmoglobin component with the mobility of hæmoglobin F. There was also an increased A_2 component. A repeat blood examination on December 10 showed that the hæmoglobin value was 3·6 grammes per 100 ml., the erythrocytes numbered 1,540,000 per cubic millimetre and the leucocytes numbered 12,800 per cubic millimetre. Radiological examination of the skull showed thickening of the diploë, with radial striation, especially in the frontal region. The metatarsals and metacarpals appeared swollen, and had a gross trabecular pattern, giving a mosaic appearance. Thinning of the cortices was noted in the long bones of the limbs. G6PD activity on the patient's admission to hospital was reported as 700 units. Later hæmoglobin electrophoresis showed the A_2 component to be split, the additional component resembling Lepore hæmoglobin.

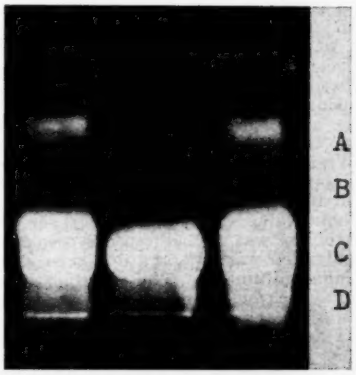

FIGURE I: Electrophoretogram in Case I. From left: first strip, Case I, second specimen; centre strip, control; third strip, Case I, first specimen. A, hæmoglobin A_2; B, Lepore hæmoglobin; C, hæmoglobin F; D, hæmoglobin A.

Family Study.

Examination of the father disclosed that the hæmoglobin value was 11·5 grammes per 100 ml., the erythrocytes numbered 4,100,000 per cubic millimetre and the leucocytes

numbered 4300 per cubic millimetre, 31% being eosinophil cells. A blood film showed some anisocytosis and a few target cells. The result of hæmoglobin electrophoresis was reported as normal, except for an increase in the A_2 component. Two or three hookworm ova per high-power field were present in the fæces. Radiological examination of the skull showed stippling, and pronounced thickening of the diploë of the frontal bone and, to a less extent, of the parietal and occipital bones.

Examination of the mother's blood showed that the hæmoglobin value was 9·2 grammes per 100 ml., the erythrocytes numbered 3,950,000 per cubic millimetre, the packed cell volume was 30%, the mean corpuscular hæmoglobin concentration was 30%, the mean corpuscular volume was 75 c.μ, reticulocytes numbered 0·8%, and the leucocytes numbered 5,600 per cubic millimetre. A stained smear showed anisocytosis and poikilocytosis. Hæmoglobin electrophoresis in her case showed an increased A_2 component.

Case II.

A male child, aged five years on April 9, 1960, who was born in the Kerema district, had been attending hospital for treatment of a refractory anæmia since July, 1957, when he received his first blood transfusion. Treatment with iron, folic acid, vitamin B_{12} and cortisone had been unavailing. He was examined again in July, 1958, and had been given transfusions by the intraperitoneal route at intervals of approximately two months until November, 1959, when the intervals between transfusions became shorter. All transfusions from this date were given intravenously. On March 21, 1959, he was readmitted to hospital with the diagnosis of hæmolytic anæmia. It was noted at this time that he had a very distended abdomen and pronounced splenomegaly. His hæmoglobin value was 2·4 grammes per 100 ml., and the reticulocyte count was 0·7%. The erythrocytes were reported as showing hypochromia, polychromasia, anisocytosis and poikilocytosis, and to be generally microcytic. The blood group was O, Rh-positive. The red-cell osmotic fragility was normal. *Plasmodium falciparum* was present in the blood on this occasion. The response to the direct Coombs test was negative, as on previous occasions. On November 12 and also on November 14, 400 ml. of blood were given, and on November 16 examination of a marrow smear showed hypoplasia of erythropoiesis. No abnormality was noted in the myelocyte series. On January 13, 1960, the hæmoglobin value was 3·9 grammes per 100 ml., the packed cell volume was 13%, the mean corpuscular hæmoglobin concentration was 30% and the leucocytes numbered 16,200 per cubic millimetre. The red cells showed microcytosis and hypochromia, polychromasia and basophilic stippling. On January 15 transfusion of one pint of blood raised the hæmoglobin level to 7·4 grammes per 100 ml. on January 19, as against an expected level of approximately 15 grammes (weight 25 lb.). Examination of the child at this time showed mongoloid facies and slight hypertelorism. The heart was enlarged to the right and left, the apex beat was in the sixth left intercostal space in the anterior axillary line. The lungs were clear. The liver was enlarged three fingers' breadth below the right costal margin in the mid-clavicular line, and the spleen was enlarged to the umbilicus. There was moderate glandular enlargement in all areas.

Radiological examination of the chest was reported as showing increased hilar markings and a greatly enlarged heart, suggestive of cardiac failure. Pronounced thickening of the frontal bone of the skull was present. Thinning of cortices was seen in all long bones, with widening of medullary spaces and coarse trabeculation. In spite of transfusions of 400 ml. on March 10 and 12, a marrow smear taken on March 18 showed intense erythroid hyperplasia, normoblastic in type, and a heavy infestation with *P. falciparum*.

On April 9 the child was admitted to hospital, apparently moribund, with a hæmoglobin value of 1·2 grammes per 100 ml., an erythrocyte count of 750,000 per cubic millimetre and a leucocyte count of 3400 per cubic millimetre. The result of the Coombs test on this occasion also was negative, and there was excess urobilinogen in the urine. The child's weight on his admission to hospital was 24 lb. On this occasion the parents agreed to splenectomy, and after transfusion until the hæmoglobin value was 15·4 grammes per 100 ml., splenectomy was performed on May 23. The peritoneum looked quite normal and there was no evidence of adhesions. The spleen weighed 21 oz. and was dark and firm in texture; the capsule appeared thickened and the cut surface fibrous. Microscopic examination showed fibrosis and an abundance of hæmosiderin, and minor areas of extramedullary hæmatopoiesis. A liver biopsy specimen, taken at the time of operation, showed extreme hæmosiderosis, but comparatively little change in the liver cells. A rib biopsy, taken at the same time, was reported as showing very active bone marrow with hæmosiderin present. On June 6 the child was discharged from hospital with a hæmoglobin value of 11·6 grammes per 100 ml. One month later his hæmoglobin value was 10 grammes per 100 ml.

On August 6 he was readmitted to hospital with a fractured metatarsal, the result of a slight blow with a stick. Radiological examination of his bones at this time showed no improvement or deterioration in the previously reported changes. On September 21 his hæmoglobin level was 4·8 grammes per 100 ml., the erythrocytes numbered 2,070,000 per cubic millimetre, the mean corpuscular volume was 65 c.μ, the packed cell volume was 13%, and the mean corpuscular hæmoglobin concentration was 22%; apparently the fall in blood values was due to a respiratory infection. Transfusion of one pint of blood raised his hæmoglobin value to 7·5 grammes per 100 ml. three days later, again a good deal less than expected, and it has persisted at this level since.

On August 6 a red-cell fragility test showed decreased osmotic fragility. On September 6 hæmoglobin electrophoresis showed the presence of excess fœtal hæmoglobin. The alkali denaturation test showed 32% undenaturated hæmoglobin. A blood film at this time showed very many nucleated red cells and marked polychromasia was present. Hypochromia, anisocytosis, poikilocytosis and target cells were prominent. Fragmented cells and a few spherocytes were seen, and Howell-Jolly bodies were numerous. A G6PD estimation gave 46 and 56 units per 100 ml. of erythrocytes in July and August respectively. On January 6, 1961, G6PD activity was reported as 36 units. On April 10 he was again admitted to hospital with acute bronchitis and a hæmoglobin value of 4·59 grammes per 100 ml., and was given another transfusion.

Family Study.

One brother is known to be suffering from refractory hypochromic anæmia of moderate degree, but electrophoresis of the patient's hæmoglobin and of that of two other siblings, as well as of the father and mother, has not shown excess hæmoglobin F to be present. The mother is also suffering from a moderately severe anæmia (hæmoglobin value 7 grammes per 100 ml., erythrocyte count 3,950,000 per cubic millimetre, leucocyte count 11,000 per cubic millimetre, packed cell volume 31%, mean corpuscular hæmoglobin concentration 72 c.μ). She has moderate hepatosplenomegaly, and hæmoglobin electrophoresis showed an increase in the A_2 component. An osmotic fragility test showed greatly increased resistance. It has since been discovered that the mother was pregnant at the time of the blood examination. Hæmoglobin electrophoresis showed an increased A_2 component in the father's blood. G6PD estimation applied to the blood of two brothers and one sister gave normal results, and the mother was shown to be an intermediate reactor.

Case III.

A male child, aged one and a half years, who was born in the Kerema district, was admitted to hospital on March 19, 1960, with a history of anæmia and failure to gain weight over the previous six months. He

had been a patient at a district hospital on several occasions, and had received treatment with iron and vitamin B_{12}. He could sit up with difficulty, and could not walk. On examination, he was noted to be undersized (weight 11 lb. 5 oz.) and pale, and to have a mongoloid facies. The apex beat was one inch outside the nipple line in the fifth left intercostal space, and the lungs were clear. The liver was enlarged two fingers' breadth below the right costal margin, and the spleen was palpable two fingers' breadth below the left costal margin. There was moderate glandular enlargement in the axillæ and groins. The hæmoglobin value was 2·4 grammes per 100 ml., the erythrocytes numbered 1,010,000 per cubic millimetre, the packed cell volume was 7%, the mean corpuscular hæmoglobin concentration was 30% and the mean corpuscular volume was 70 c.μ; the leucocytes numbered 10,400 per cubic millimetre, 56% being lymphocytes, 33% neutrophils and 11% eosinophils. The reticulocyte count was 0·2%. Examination of a blood film showed pronounced anisocytosis and poikilocytosis of the red cells, and the presence of nucleated red cells. The blood group was O MN S, CDe/cde (R_1r). The red-cell osmotic fragility was reported as normal, as was also the serum bilirubin level.

On March 3 the alkali denaturation test on blood taken on February 23 showed 0·19% undenatured hæmoglobin present, and the result of hæmoglobin electrophoresis was reported as normal. On March 23, 300 ml. of blood were given. A tibial puncture was performed on March 28, and although the cortex could be penetrated with very slight pressure, it was exceedingly difficult to aspirate any marrow. Examination of the small amount of bone marrow obtained showed no abnormality apart from lymphocytic infiltration. The result of the Coombs test was negative, and the result of the Mantoux test was negative also. Radiological examination of the chest revealed a greatly enlarged heart and increased hilar markings, but the peripheral parts of the lungs were clear. The diploë of the frontal bones showed widening, and pronounced stippling of the frontal and parietal bones was present. The long bones, the metacarpals and metatarsals and the phalanges all showed gross osteoporosis, with cortical thinning and a mosaic appearance of the medulla.

Treatment with iron, folic acid and cortisone for one month, after a blood transfusion shortly after the child's admission to hospital, was unavailing, and on May 10 the hæmoglobin value was 5 grammes per 100 ml. On May 26, 400 ml. of blood were given slowly; but on June 15 the hæmoglobin level was only 8·6 grammes per 100 ml. A further 400 ml. of blood were given on June 25, and on June 30 the hæmoglobin value was 15 grammes per 100 ml.

At this time *P. falciparum* was found in the blood film, and it was noted that the child's inguinal lymph glands were enlarged; a biopsy showed the typical appearances of tuberculous infection. Mantoux tests with old tuberculin in strengths of 1:1000 and 1:100 again gave negative results. Treatment with streptomycin, INH and PAS was commenced on this date. Another examination of the bone marrow at this time showed no evidence of hyperplasia, but lymphocytic infiltration was again marked. On September 22, as the hæmoglobin value had fallen to 1·8 grammes per 100 ml. and the erythrocytes numbered 870,000 per cubic millimetre, a transfusion was given intraperitoneally, and his hæmoglobin value was raised to 7·2 grammes per 100 ml. In spite of this the alkali denaturation test showed 39·8% undenatured hæmoglobin. Two weeks after an intravenous transfusion on November 15 the undenatured hæmoglobin value was 12·8%, and hæmoglobin electrophoresis showed A and F components with more A than F and an increased A_2 component. On November 7, nucleated red cells and spherocytes were seen in the peripheral blood, and the marrow showed evidence of erythroid hyperplasia. In spite of this, on November 15 the hæmoglobin value was 3 grammes per 100 ml. It is perhaps worth recording that on October 17 the patient fell about two feet onto the floor and sustained an impacted fracture of the right tibia. A liver biopsy on December 20 was reported as showing pronounced hæmosiderosis. In May G6PD activity was reported as 470 units; when the examination was repeated on November 15, the activity was 138 units. The reticulocyte percentage at this time was only 0·1. Hæmoglobin electrophoresis showed the A_2 component to be split, the additional component resembling Lepore hæmoglobin.

Family Study.

Examination of the father and mother and of a half-brother showed the presence of a refractory hypochromic microcytic anæmia and an increased A_2 component on hæmoglobin electrophoresis in all cases.

Case IV.

A female patient, aged one year, from the Kerema district, was admitted to hospital on February 20, 1960, with a history that she had had gastro-enteritis for three days previously. The mother said that the child had always been pale and had had frequent attacks of respiratory infection, but this was the first time that she had brought her to hospital. She also said that the child seemed to be backward, could not stand by herself or crawl and was making no attempt to walk, but appeared to be mentally alert. The child had been breast fed from birth, and was still receiving some milk from the mother, but her appetite for other foods appeared to be poor. On examination of the child, she was seen to be emaciated, with pronounced bossing of the frontal and parietal bones and delayed dentition, only four teeth being present. The head appeared large in relation to the body, and there was a good deal of generalized muscle wasting and very little subcutaneous fat anywhere. The abdomen was protuberant. The heart was enlarged to the left, and a systolic murmur of the ejection type was heard at the base. Femoral pulses were present. The chest appeared clear to auscultation. The spleen was enlarged to two and a half fingers' breadth below the left costal margin, and the liver was palpable one finger's breadth below the right costal margin. A blood examination gave the following information. The hæmoglobin value was 4·5 grammes per 100 ml., the erythrocytes numbered 2,920,000 per cubic millimetre, the packed cell volume was 16%, the mean corpuscular hæmoglobin concentration was 28%, the mean corpuscular volume was 56 c.μ, and the leucocytes numbered 10,600 per cubic millimetre, and the distribution was normal for the patient's age. Alkali denaturation showed 72% undenatured hæmoglobin. Hæmoglobin electrophoresis (starch block) showed 90% of hæmoglobin F. The Coombs test produced a negative result. Examination of a film of the peripheral blood showed anisocytosis, with some large thin cells and small fragments. Poikilocytosis was pronounced; target cells were present, and also a fair number of nucleated red cells. The reticulocyte count was 3·1%. The serum bilirubin content was 1·4 mg. per 100 ml. No malarial parasites were seen in the blood. The serum calcium, phosphorus and phosphatase levels were normal. The urine was normal except for excess urobilinogen. No pathogens were grown from the stool. The serum iron content was 156 μg. per 100 ml. Radiological examination showed generalized cardiac enlargement, but the lung fields were clear. In the skull there was thickening of the diploë of the frontal bones with vertical striation. In the long bones there was thinning of the cortices, with osteoporosis and pronounced trabeculation, which was most conspicuous in the tubular bones of the hands and feet, giving a mosaic appearance.

Treatment for the gastro-enteritis was successful, and the child was discharged from hospital on March 4. She was readmitted on March 23 because of another attack of diarrhœa. Her condition was as previously, except that there had been a rise in her hæmoglobin level and she looked slightly better than on the previous occasion. At this time blood examination gave the following results. The hæmoglobin value was 5·8 grammes per 100 ml., the erythrocytes numbered 2,820,000 per cubic millimetre, the packed cell volume was 20%, the mean corpuscular hæmoglobin concentration was 29%, and the mean corpuscular

volume was 71 c.μ; the leucocytes numbered 19,550 per cubic millimetre, 71% being lymphocytes, 20% neutrophils, 5% monocytes and 4% eosinophils. The peripheral blood showed similar features to those described above—hypochromia, anisocytosis with macrocytes and microcytes, pronounced poikilocytosis and target cells. Not so many nucleated red cells were seen on this occasion.

It has not been possible to investigate the family of this patient so far except for the mother, who shows an increased A_2 component on hæmoglobin electrophoresis.

Comment.

It was not possible to carry out complete investigations on the families of these patients, but it will be noted that all parents examined were found to have an increased A_2 component on hæmoglobin electrophoresis. The delay in establishing the diagnosis in Cases II and III requires some comment. In the first place, hæmoglobinopathy was believed not to occur in Melanesians (Jonxis *et alii*, 1958; Price, personal communication, 1960), and it had been known for several months that a blood disorder similar to thalassæmia, but without excess hæmoglobin F, did occur, and was in fact probably commoner than thalassæmia in some areas of New Guinea (unpublished observations). Because of this, both cases were regarded as examples of this latter disease, particularly in view of the normal results to Singer's test and hæmoglobin electrophoresis. It is unfortunate, also, that it was not realized how seriously endogenous erythropoiesis could be depressed by transfusion, although this had been well described by Smith *et alii* (1955). In fact, in Case II hypoplastic marrow was noted on November 16, 1959, four days after large transfusions. That this does not always occur is suggested by the finding of a hyperplastic marrow six days after a large transfusion (March 18, 1960). It was not realized also that normal red-cell osmotic fragility was consistent with a diagnosis of thalassæmia, even though this is not common (Baty *et alii*, 1932; Dameshek, 1940; Valentine and Neel, 1944). The fact that, when this test was repeated after splenectomy, increased resistance was found, could merely substantiate the observation that the peripheral blood might approximate to normal during the period of increased transfusion requirements (Smith *et alii*, 1955). On the other hand, it is well known that after splenectomy in normal persons, the blood shows target cells and flat, thin cells, and these have a decreased osmotic fragility. Similarly, Howell-Jolly bodies may be a post-splenectomy phenomenon.

It is probably merely coincidental that the patient in Case II, who had been maintained by intraperitonal transfusion for 10 months before November, 1959, became worse soon after resumption of the intravenous route for transfusion. It is also noted that Singer's test showed 39·8% undenatured hæmoglobin two weeks after an intraperitoneal transfusion in Case III, although two weeks after an intravenous transfusion only 12·8% of undenatured hæmoglobin was present. It is conceivable that the slower rate of absorption of blood by the intraperitoneal route may have a less depressing effect on erythropoiesis and hæmoglobin synthesis. It has been shown that, although significant absorption of blood does occur from the peritoneal cavity within 24 hours, as evidenced by a rise in hæmoglobin value and a more normal peripheral blood film, the maximal effect is not attained for three to five days or later (Macdougall, 1958; Newman, 1959). However, in the case described by Newman a "dilution" of hæmoglobin F did follow intraperitoneal transfusion. When it is also considered that Smith *et alii* (1955) have shown that the fall in circulating hæmoglobin F is evident after the first week following intravenous transfusion, and persists until all the donor blood has disappeared at about seven weeks, it is unlikely that the route used has any significant effect on the final result, unless transfusion by the intraperitoneal route is less efficient and so does not produce such pronounced polycythæmia.

There is no doubt that, because of the large volume of blood given in Cases II and III, a relative polycythæmia was produced, causing severe depression of marrow activity, as was shown to occur in normal young adults by Birkhill *et alii* (1951). However, it is possible that infection with *P. falciparum* and malnutrition were the cause of the initially low hæmoglobin F value in Case III, as no transfusion had been given at that time. This seems likely, in view of Chatterjea's two cases of hæmoglobin E thalassæmia, in which the patients suffered an aplastic crisis after an induced attack of malignant tertian malaria (Chatterjea, 1957*a*). He also described another case of hæmoglobin E thalassæmia in a male, aged 20 years, in which the underlying disorder was not evident until marrow regeneration had occurred (Chatterjea, 1957*b*).

The relationship between the finding of tuberculous glands in Case III and the normal result of the Singer's test is doubtful, as it is probable that this disease was contracted after the patient's admission to hospital, both parents being free of the disease. It is realized that an acquired hæmolytic anæmia has been described in various types of tuberculosis (Wintrobe, 1956), and this may have been superimposed here. However, there has been no relief of the anæmia since anti-tuberculosis treatment was started four months ago, although the glands have decreased in size and the spleen also has become smaller.

In Case II, the failure to obtain the expected hæmoglobin levels after transfusions, both before and after splenectomy, gives further support to the hypothesis of Smith *et alii* (1955) that transfusions have a suppressive effect on hæmoglobin production.

Spontaneous fractures do occur in thalassæmia, but, as Caffey (1945) states, in view of the extreme cortical atrophy, it is surprising that they are not more common. It would seem that the pronounced thinning of the cortices of the long bones of Cases II and III did predispose to the fractures resulting from minimal trauma which both patients sustained.

It is difficult to evaluate the significance of the hypochromic microcytic anæmia noted in all the parents, except the father in Case II, as complete studies were not possible. Iron deficiency of some degree was probably present in the mothers, but it would seem likely, in view of the increased A_2 component in all parents examined, that it represents the thalassæmia trait (Kunkel *et alii*, 1957; Silvestroni *et alii*, 1957; Gerald and Diamond, 1958; Chatterjea *et alii*, 1957).

It has not been possible to assess the relationship of thalassæmia to malarial infection in these cases, except to state that the second and third patients both had numerous parasites—*P. falciparum*—in their blood at some stage, but appeared to be little affected clinically. This could possibly be expected in the children on account of their age (Peters, 1960).

All children were significantly retarded in their development; this is opposed to the experience of Smith *et alii* (1960), who state that usually children suffering from thalassæmia major grow normally until the age of eight to ten years. It is well known that in countries like New Guinea growth and development are checked after six months owing to the poor diet (Trowell and Jelliffe, 1958), and this may have had some effect. However, all the patients were backward by any standard.

While it is too soon to state how effective splenectomy has been in Case II, there is no doubt that transfusion requirements have been considerably reduced. This would appear to agree with the findings of Smith *et alii* (1960) and of Minnich *et alii* (1954). Obviously, in view of the diminished resistance to infection reported as following splenectomy (Robinson, 1957; Burman, 1958; Huntley, 1958; Smith, 1957), this operation cannot be considered in Case III, because of the child's tuberculous infection. However, it does appear that the intervals between transfusions are becoming shorter, and that splenectomy may have to be considered later. The finding of low enzyme content in the red cells in Case II suggests that the patient is of the Negroid type of G6PD deficiency, and thus probably sensitive to certain drugs, and perhaps to fava

beans, etc. Whether any of his hæmolytic episodes are due to this second lesion has been impossible to determine. This aspect will be dealt with more fully in another article. The presence of an additional hæmoglobin component in two children as shown by electrophoresis is puzzling, because this component has not been seen in any of the parents examined. It appears to have the mobility of Lepore hæmoglobin, and both the clinical and hæmatological findings are typical of thalassæmia major, as was shown to be the case in the original patient described by Gerald and Diamond (1958). These authors suggested that the condition was more closely allied to thalassæmia than to the hæmoglobinopathies. However, the abnormal component was found in several members of the family of their patient, unlike the cases described above. An attempt is being made to investigate this problem further. This abnormal component was subsequently found on electrophoresis in the case described recently (Ryan, 1961), and is possibly the cause of the patient's intermediate state.

Summary.

Four cases of thalassæmia diagnosed in Papuan children have been described. Three of the four came from widely separated areas in New Guinea, and in three an abnormal component resembling Lepore hæmoglobin was present. However, this component was not demonstrated in the parents.

Delay in diagnosis was due to failure to recognize the suppressive effect of transfusion on erythropoiesis, and possibly to the presence of an aplastic crisis resulting from malnutrition and infection, in at least one case. No doubt also the "dilution" effect of recent transfusions caused some reduction of hæmoglobin F in Case II.

Reference is made to the possibly smaller effect of intraperitoneal transfusion on endogenous erythropoiesis, as against intravenous transfusion. However, this observation may not be valid in a disease which can normally show wide variations, and the condition noted was probably due to other factors, which are discussed.

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References.

BATT, J. M., BLACKFAN, K. D., and DIAMOND, L. K. (1932), "Blood Studies in Infants and in Children. I. Erythroblastic Anemia, a Clinical and Pathologic Study", *Amer. J. Dis. Child.*, 43: 667.

BIRKHILL, F. R., MALONEY, M. A., and LEVENSON, S. M. (1951), "Effect of Transfusion Polycythemia upon Bone Marrow Activity and Erythrocyte Survival in Man", *Blood*, 6: 1021.

BURMAN, D. (1958), "Congenital Spherocytosis in Infancy", *Arch. Dis. Childh.*, 33: 335.

CAFFEY, J. (1945), "Pediatric X-Ray Diagnosis", Year Book Publishers, Chicago: 732.

CHATTERJEA, J. B. (1957*a*), "Aplastic Crisis in Hb E-Thalassæmia Disease", *Bull. Calcutta Sch. trop. Med.*, 5: 94.

CHATTERJEA, J. B. (1957*b*), Proceedings of the Symposium on Abnormal Hæmoglobins, Istanbul, C.I.O.M.S.

CHATTERJEA, J. B., SWARUP, S., GHOSH, S. K., and RAY, R. N. (1957), "Incidence of Hæmoglobin E and of Thalassæmia Trait in Bengalese", *Bull. Calcutta Sch. trop. Med.*, 5: 159.

COOLEY, T. B., and LEE, P. (1925), "Series of Cases of Splenomegaly in Children with Anemia and Peculiar Bone Change", *Trans. Amer. pediat. Soc.*, 37: 29.

GERALD, P. S., and DIAMOND, L. K. (1958), "The Diagnosis of Thalassemia Trait by Starch Block Electrophoresis of the Hemoglobin", *Blood*, 13: 61.

GERALD, P. S., and DIAMOND, L. K. (1958), "A New Hereditary Hemoglobinopathy (the Lepore Trait) and its Interaction with Thalassemia Trait", *Blood*, 13: 835.

HUNTLEY, C. C. (1958), "Infection following Splenectomy in Infants and Children", *Amer. J. Dis. Child.*, 95: 477.

JONXIS, J. H. P., HUISMAN, T. H. J., DA COSTA, G. J., and METSELAAR, D. (1958), "Absence of Abnormal Hæmoglobins in Some Groups of the Papuan Population of Dutch New Guinea", *Nature*, 181: 1279.

KUNKEL, H. G., and WALLENIUS, G. (1955), "New Hemoglobin in Normal Adult Blood", *Science*, 122: 288.

KUNKEL, H. G., CEPPALINI, R., MULLER-EBERHARD, U., and WOLF, J. (1957), "Observations on the Minor Basic Hemoglobin Component in the Blood of Normal Individuals and Patients with Thalassemia", *J. clin. Invest.*, 36: 1615.

MACDOUGALL, L. G. (1958), "Intraperitoneal Blood Transfusions in Children", *Brit. med. J.*, 1: 139.

MINNICH, V., NA-NA KORN, S., CHONGCHAREONSUK, S., and KOCHASENI, S. (1954), "Mediterranean Anemia. A Study of Thirty-Two Cases in Thailand", *Blood*, 9: 1.

NEWMAN, C. G. H. (1959), "Intraperitoneal Transfusion of Blood in a Child with Cooley's Anæmia", *Lancet*, 1: 230.

PETERS, W. (1961), personal communication.

ROBINSON, G. C. (1957), "Hereditary Spherocytosis in Infancy", *J. Pediat.*, 50: 446.

RYAN, B. P. K. (1961), "Thalassæmia: Report of a Case in Papua", MED. J. AUST., 1: 128.

SILVESTRONI, E., BIANCO, I., and MODIANO, G. (1957), "The Discriminating Value of HbA_2 between Normal and Microcythæmic Subjects", *Progr. Med.* (*Napoli*), 13: 772.

SINGER, K., CHERNOFF, A. I., and SINGER, L. (1951), "Studies on Abnormal Hemoglobins. 2. Their Identification by Means of the Method of Fractional Denaturation", *Blood*, 6: 429.

SMITH, C. H., ERLANDSON, M. E., SCHULMAN, I., and STERN, G. (1957), "Hazards of Severe Infections in Splenectomized Infants and Children", *Amer. J. Med.*, 22: 390.

SMITH, C. H., ERLANDSON, M. E., STERN, G., and SCHULMAN, I. (1960), "The Role of Splenectomy in the Management of Thalassemia", *Blood*, 15: 197.

SMITH, C. H., SCHULMAN, I., ANDO, R. E., and STERN, G. (1955), "Studies in Mediterranean (Cooley's) Anemia. II. The Suppression of Hematopoiesis by Transfusions", *Blood*, 10: 707.

TROWELL, H. C., and JELLIFFE, D. B. (1958), "Diseases of Children in the Sub-Tropics and Tropics", 1st Edition, Arnold, London: 57.

WINTROBE, M. M. (1956), "Clinical Hematology", 4th Edition, Lea & Febiger, Philadelphia: 621, 795.

ZINKHAM, W. H., LENHARD, R. E., JUN., and CHILDS, B. (1958), "A Deficiency of G-6-P.D. Activity in Erythrocytes from Patients with Favism", *Bull. Johns Hopk. Hosp.*, 102: 169.

Addendum.

Since the foregoing was written, two children with hypochromic anæmia and increased hæmoglobin F have been examined in Madang. Both have required frequent blood transfusions during their short lives, and the peripheral blood film of one prior to his last transfusion was typical of thalassæmia. However, both had recently received transfusions when they were seen by the writer.

Reviews.

The Surgical Treatment of Portal Hypertension, Bleeding Esophageal Varices and Ascites. By M. J. Mackby, M.D., D.A.B.S., F.I.C.S., and with a foreword by Emile Holman, M.D.; 1960. Springfield, Illinois: Charles C. Thomas; Oxford: Blackwell Scientific Publications Ltd.; Toronto: The Ryerson Press. 10″ × 6¾″, pp. 268 with illustrations. Price: 84s. (English).

THE problem of portal hypertension together with its two major complications, bleeding œsophageal varices and intractable ascites, has attracted great interest over the past two decades. As the subject is very much in the common ground between medicine and surgery, monographs on this topic are frequently appearing, written by both physician and surgeon; the most recent one to hand, the present book, is, as its name implies, essentially a surgical approach to the problem. In it the author has not only given his own views, but has summarized in a separate chapter at the end of the book the current opinions regarding the clinical management of these patients from a nation-wide survey of all those in the United States

working in the larger medical centres in this field. He has, therefore, produced what is in effect a compendium of present knowledge, and the extent of this may be gauged from the fact that the bibliography at the end of this monograph extends over some 60 pages and contains 1354 references. The subject matter is not, however, unduly prolix, and in fact is both crisply presented and clearly outlined. It makes a useful addition to the already extensive literature on the subject, and is particularly valuable as a source of references for any specific problem which may require to be investigated.

Epidemiology of Cardiovascular Diseases: Methodology: Hypertension and Arteriosclerosis. Edited by Herbert Pollack, M.D., and Dean E. Krueger; Report of Conference, Princeton, New Jersey, April 24-26, 1959: Supplement to *American Journal of Public Health and the Nation's Health*, Volume 50, No. 10; 1960: American Public Health Association, Inc. 9¾" x 6¾", pp. 128. Price $1.00.

WITH the passing of the infective diseases as the principal cause of mortality, increased interest is being shown in the chronic and degenerative diseases and in the hereditary diseases. In particular, it is now held that the diseases of the cardio-vascular system are amenable to the techniques of epidemiological survey. This supplement is devoted to a conference held at Princeton, New Jersey, in April, 1959, under the sponsorship of the American Heart Association and the National Heart Institute, United States Public Health Service. The reports of committees are given. In the report on design and analysis of studies, a very clear picture is given of the problems in epidemiological surveys, retrospective and prospective studies, cross-sectional survey, sampling, non-response to inquiries, measurement. Criteria for diagnosis are laid down. Diet, physical activity and biochemical measurements are considered by another committee. The least satisfactory report is on "cultural, societal, familial, psychological and genetic influences", as the discussion becomes rather vague and loaded with jargon. Apparently a common cause of hypertension is that the patient would like to act like a psychopath, but the fear of retaliation is overwhelming. It would have been better to take genetics out of this social report and give it a separate chapter.

The supplement is written for clinicians, and covers the ground adequately. It should be read by all interested in inquiring into one of the greatest causes of human mortality—cardio-vascular disease.

The Clinical Use of the Revised Bender-Gestalt Test. By Max L. Hutt and Gerald J. Briskin; 1960. New York and London: Grune & Stratton. 9" x 6", pp. 176, with illustrations. Price: $5.00.

THE Bender-Gestalt test is used to assess intellect and personality, usually of psychiatric patients, by studying their copies of standard geometrical designs. The present version is a revision, inasmuch as it switches interpretative emphasis from cognitive competence (for example, whether the patient has the intellectual capacity to copy a diamond) to motivational influences (for example, whether timidity has caused a reduction in figure size). Broadly, then, the technique belongs with graphology, but is an improvement, because the figures are standardized and varied and the task is unpractised. The authors make use of research on the effects of intellectual maturity on the perception of visual patterns, but add interpretations based partly on an intuitive awareness of personality variables such as orderliness, partly on psychoanalytical theory of mental dynamics, and partly on empirical studies of indications of conventional psychiatric illnesses.

The book lucidly describes the history, administration and interpretation of the test, and then provides some case illustrations, probably selected to be convincing. The manual does not make possible the use of the test without a thorough background training in psychodynamic theory. Important technical matters—especially reliability and validity—are touched on at points, but not dealt with exhaustively. Whilst references to relevant research are given, our impression is that the confidence to be placed in the findings is less than is implied by the authors.

Common criticisms of projective techniques apply to this technique. It tries to find out too much with a single instrument, traits are created by *fiat*, there is over-generalization from test to life situations, analogical thinking is left unvalidated, and the great tolerance of individual variations in response introduces scope for unimportant and accidental factors to enter on the scene. Here is an example. There is something in the notion that a circle symbolizes the female, a square the male (indeed, genetic scientists use these symbols in their genealogical trees). One female patient drew a circle in a square, where the original location was beside it. This is riskily interpreted as an attempt to deny femininity in favour of masculine identification. We think the drawing could have been construed as a superimposition—with a different interpretation. Is it the patient or the psychologist who is being revealed? This example is an extreme one and not typical of the book, which on the whole presents many fruitful hypotheses for research, but to the conservative psychologist seems premature as a publication about a finished instrument.

A Synopsis of Public Health and Social Medicine. By A. J. Essex-Cater, M.R.C.S., L.R.C.P., D.C.H., D.P.H., D.I.H., F.R.A.I.; 1960. Bristol: John Wright & Sons Ltd. 7¼" x 4¾", pp. 576. Price: 55s. (English).

MEDICAL teachers rightly revile the use by students of synoptic works, as alternatives to standard textbooks, for the terse outlines of the digest, devoid of background and explanation, are an inadequate introduction to a subject for beginners. The value of the synopsis rests in its provision of ready means for reference, revision and compact review of its subject's broad scope. In this latest addition to Wright's Synopsis Series, the author, who is Medical Officer of Health of Birmingham City and Lecturer at the University of Birmingham, has produced a well-balanced and comprehensive summary, which adequately fulfils these requirements. The disadvantages of this form of presentation are minimized by the insertion of introductory and explanatory passages, a generous allotment of space in sections where discursiveness is necessary, and an expression of the author's views on controversial matters.

The work opens with a critical review of the British health services, including their legislation, organization and administration, followed by a chapter on the history of public health and social medicine. Epidemiology, which is introduced by a chapter on medical statistics, is usefully presented, and is extended by an interesting consideration of the major causes of death, referring particularly to circulatory and respiratory diseases, cancer and accidents. The communicable diseases, and occupational health, including a review of various aspects of industrial practice and of specific occupational disorders, are very satisfactorily treated. Other subjects appearing in the wide purview of the book include environmental health, maternal and child care, neglected and delinquent children, the care of the aged, welfare and school health services and mental health.

The book is highly commended for public health practitioners and workers in allied fields, and forms a useful means of revision for graduate students and a ready and up-to-date reference work for doctors generally.

Valvular Disease of the Heart in Old Age. By P. D. Bedford, M.D., M.R.C.P., and F. I. Caird, D.M., M.R.C.P.; 1960. London: J. & A. Churchill Ltd. 8" x 5", pp. 206, with 38 illustrations. Price: 30s. net (English).

THE formal establishment of geriatric units under the British National Health Service has provided special opportunities for the observation of the closing chapters of many kinds of disease by deliberate and well-trained physicians—physicians having a special experience of the reaction of the elderly to physical threats, as well as having a specialized interest in one or more of the bodily systems. If, in addition, pathological and X-ray facilities are available, important gaps or uncertainties in regard to incidence, diagnosis and prognosis can be clarified.

Bedford and Caird have made excellent use of their opportunities in this regard, in a study of valvular disease of the heart among in-patients of the Cowley Road Hospital, Oxford. During a period of six years, 419 such patients were discovered, mainly over the age of 70 years. Of these, 126 suffered from rheumatic mitral disease, 132 from aortic stenosis and 138 from "isolated" aortic incompetence. Half of these patients were later examined at autopsy, when the diagnosis and physical signs were correlated. The authors have produced a most careful, if rather tedious, study of each type of anatomical lesion, with information as to its incidence and its clinical, X-ray and cardiographic features. They have made a very full study of the literature, and have analysed their results in an impressive actuarial fashion. Physical diagnosis is obviously more difficult in the elderly, and the clinician may have considerable difficulty in preparing a reliable history. Proof is provided that rheumatic heart disease is not rare in old age. Looking back over the "course", as it were, shows that the survivors had fewer clinical recurrences, and that active damage was

in progress as late as the fourth and fifth decades. In mitral stenosis certain physical signs were consistently absent, such as the opening snap. Certain signs were always present, such as a mitral systolic murmur. A right ventricular heave was not observed; a presystolic thrill was rare. Recognition of the possibility of rheumatic heart disease is the chief attribute required of the observer. Aortic stenosis was common, and post-mortem confirmation highlighted the importance of the ejection click, the ejection-type murmur and the paradoxical splitting of the second heart sound. Marked diminution of the aortic second sound occurred in 60% of subjects. The presence of a thrill, and of post-stenotic dilatation of the ascending aorta, cannot be relied upon in the elderly. The authors hold that aortic stenosis of the degenerative type can develop in two to five years. They do not settle the question as to the proportion of examples of aortic stenosis which are rheumatic. The authors found aortic incompetence as frequently as aortic stenosis in their series. An aortic systolic murmur was also present in 83% patients, but this did not usually signify narrowing at aortic-valve level. The frequency of isolated aortic incompetence is ascribed to senile changes in the elastic layers of the aortic root. Luetic disease was much rarer, and was often associated with the presence of visible calcium on X-ray examination of the ascending or descending aorta.

Helpful advice is included regarding treatment of heart failure in old people, in whom digitalis overdosage is readily achieved and barbiturates are less satisfactory than chloral preparations for insomnia. The frequent coexistence of pyelonephritis, anæmia and vitamin lack is an important fact to the therapist, while the subtle and serious development of pulmonary embolism may explain a sudden deterioration. Anticoagulants offer more difficulties and inconsistencies in effect than with younger patients.

There are a few good photographs of diseased valves and a good bibliography. The little volume is carefully compiled by experienced and expert observers, and forms a useful guide to the newcomer to the care of the elderly cardiac patient.

Diseases of the Skin. By James Marshall, M.D. (Lond.): 1960. Edinburgh and London: E. & S. Livingstone Ltd. 8½" × 5½", pp. 952, with many illustrations. Price: 84s. net (English).

THIS is not just another textbook of dermatology, but a sincere and successful effort to provide for undergraduate and post-graduate students a sound and sensible reference. The balance between the requirements of undergraduate and post-graduate is difficult to strike, but the author has achieved this balance admirably. The common names of dermatoses are given clearly, together with their synonyms and fancier titles. This is a great help to everyone, particularly to those intending to specialize. The book is consistent in its pithy definitions and descriptions of diseases. The contents, consisting of 39 chapters with a good short bibliography and index at the end of the volume, are arranged somewhat differently from the older textbooks, which sometimes lack the refreshing directness of this work.

The early chapters on anatomy, physiology and basic changes are more or less of standard type. The principles of treatment are well laid down and up to date. The author leaves no doubt that the way to avoid mishaps by the application to the skin of sulphonamides and antihistamines is not to use them. The uses of X-ray therapy in skin diseases are analysed fairly and critically, and most Australian dermatologists would agree with the limitations of this modality as described in this analysis. The author stresses that diathermy and cauterization can often be used as alternatives to X-ray therapy, and mentions the diminishing need for epilation in fungous diseases of the scalp.

It is a little disappointing to note in Chapter VI that psychological factors in ordinary eczema and dermatitis are minimized, although Chapter X admits the rôle of functional nervous changes in the cause and aggravation of certain dermatoses. In Australia we place much more emphasis on psychic factors in atopic eczema. However, the warning is well sounded that we should not be too eager to grasp at psychic causes for dermatoses, thus avoiding the more critical investigation required to find the real cause. The psychic investigation and analysis seem to be better performed in relevant dermatoses by the common-sense dermatologist than by the trained psychiatrist.

The histological investigation of dermatoses is given adequate space in this work, although histological changes are not discussed in great detail. This is in keeping with the expressed intention of the book to provide logical material for all types of readers.

The details of dermatoses as they occur in Africans are of great interest to Australian readers, particularly the treponematoses and major infective states, such as tuberculosis and leprosy.

We have very little fault to find with Dr. Marshall's textbook and appreciate its conciseness and directness. It is recommended to all dermatologists and intending dermatologists.

Circulatory Ulcers: A Physical Approach. By Hilton G. Tranchell, B.D. (Yale), M.C.S.P., and Charles R. Bannister, M.C.S.P.; 1960. Bristol: John Wright & Sons Ltd. 7¼" × 4¾", pp. 92, with illustrations. Price: 12s. 6d. (English).

THIS little book is a valuable addition to the writings on the subject of leg ulcers. It is written by physiotherapists primarily for physiotherapists. It could well be studied by doctors also.

The book gives a clear description of various types of ulcers and their association with different types of circulatory conditions. It goes on to describe treatment from a physiotherapeutic point of view, and stresses the importance of correlating this with other methods, such as surgery.

Treatment is dealt with in great detail in relation to the types of physiotherapy employed, and there is a section on local applications. The authors admit that every clinic has its favourite in this regard, and emphasize that physiotherapists should note and understand the various substances they encounter.

This book rightly stresses the necessity for team work and enthusiasm in the treatment of ulcers of the leg, and also rightly values physical methods above local applications.

Electron Microscopy in Anatomy: Proceedings of a Symposium held by the Anatomical Society of Great Britain on the Ultra-Structure of Cells. Introduced by J. Z. Young; 1961. London: Edward Arnold Ltd. 9¼" × 6", pp. 296 with illustrations. Price: 50s. net (English).

THIS work is the outcome of a two-day symposium on "The Ultrastructure of Cells" held by the Anatomical Society of Great Britain and Ireland in April, 1959. The list of contributors includes many well known in this field, and with two exceptions all the papers are published here. The book opens with a short introduction by J. Z. Young, which is followed by some useful chapters on the theory and technique of electron microscopy. Succeeding chapters present the work of individual contributors on their own particular subject; these sections are interesting, well presented and, generally, well illustrated. However, selection of authors rather than subjects, as in most symposia, precludes the possibility of a truly systematic and representative survey. Those looking for a systematic approach will complain of the preponderance of papers on the nervous system; membranes loom large, as would be expected, and most of the rest of the work is devoted to secretion and excretion, with a few glances at teeth, muscle and duodenum. On the other hand, the title does not promise a systematic survey, and the initiated would not have expected this in so small a compass. However, this does suggest that in future symposia more attention should be given to securing over-all representation by choosing contributors on the basis of subjects rather than of names. These criticisms apart, this book does bring out the tremendous progress in knowledge derived from the electron microscope during the past ten years. Anatomy, indeed, has been completely revolutionized and rejuvenated by the introduction of this powerful tool; no longer need anatomists feel a sense of inferiority *vis-à-vis* their physiological colleagues, for they can now give a name and habitation to many of the nebulous systems so airily postulated in the past. If this stimulates a closer cooperation in the future, so much the better. At all events, this little book points the way, and it will be read with interest by all those concerned with discovering how structure and function can be correlated near the ultimate limits of perception.

Electron Microscopy: A Handbook for Biologists. By E. H. Mercer, D.Sc., Ph.D., and M. S. C. Birbeck, M.A.; 1961. Oxford: Blackwell Scientific Publications. 7½" × 5", pp. 76, with figures. Price 9s. 6d. (English).

THE authors are both well-known electron microscopists at the Chester Beatty Research Institute, and very well qualified to produce a work of this kind. Their objective

was a simple handbook of more or less foolproof information on the basic techniques employed in the preparation of biological material for electron microscopic examination. The nature of the electron microscope limits the techniques very considerably in comparison with those employed for light microscopy, but they are correspondingly more exacting. Yet they can be described simply and concisely within a relatively small space, as the authors show. Very little is omitted, and certainly nothing essential. Part I covers fixation, washing and dehydration, embedding, staining, section cutting, special methods for bacteria, tissue cultures and plants, shadowing, replication and negative staining. Part II gives the formulæ for reagents, how to mix them and where to get them, a very useful bibliography and an adequate index. However, this is not just a factual compilation; the authors throw in many practical hints and cautions as they go along. The condensed style obscures the meaning of one or two sentences, and the last sentence of the first paragraph on page 8 should start, surely, with "saturated", not "unsaturated". Apart from this, the work is a model of clarity, and we can confidently recommend it to every intending, tiro or even practising electron microscopist.

Textbook of Pathology: An Introduction to Medicine. By William Boyd, M.D., Dipl. Psychiat., M.R.C.P. (Edin.), Hon. F.R.C.P. (Edin.), F.R.C.P. (Lond.), F.R.C.S. (Can.), LL.D. (Sask.), (Queen's), D.Sc. (Man.), M.D. (Oslo); seventh edition, thoroughly revised; 1961. Philadelphia: Lea & Febiger; Sydney: Angus & Robertson. 10″ × 7″, pp. 1370, with illustrations. Price: £9 18s.

IN this edition this textbook of pathology has increased in length, weight and price by about half. The author has revised the book extensively, adding much new material.

In the first part, which deals with the principles of pathology, many chapters have been subdivided, more space being given to such topics as fungal and viral infections, immunity and hypersensitivity, and ionizing radiation. There is a new chapter on derangements of body fluids which is particularly welcome. The second part of the book covers regional pathology, and includes recent work on many subjects. This is sometimes given undue prominence; pulmonary alveolar proteinosis, for instance, is not of sufficient importance to merit more than a page of text and illustration in an undergraduate textbook. For those who wish to explore the literature there are good lists of references to key articles.

As in previous editions, the writing is clear and vigorous. The author has made a constant effort to relate pathological changes to clinical findings by discussing the disorders of function present in each disease. Undergraduates have appreciated this approach in earlier editions after struggling to learn pathology from more conservative textbooks with a heavy emphasis on morbid anatomy.

However, there are a number of criticisms which should be made. Inconsistent statements remain when an old error has been corrected in one place and left in another, as in the references to the part which silica plays in coal-workers' pneumonoconiosis. A number of illustrations are badly printed and fail to illuminate the subject. For instance, figure 240 (Anitschkow cells), figure 429 (carcinomatous invasion of the stomach wall) and figure 737 (synovial membrane with a plasma cell in rheumatoid arthritis) add nothing to the text. And, most important, the book is too detailed in many parts for the medical student for whom it is written.

This edition can be recommended as a reference book for the undergraduate and as suitable for the medical practitioner who wishes to keep his pathology up to date—an essential if his treatment is to have a rational basis. It will suit some students as their principal textbook of pathology, but, for most, it will not replace "Muir" for this purpose.

Surgical Errors and Safeguards. By Max Thorek, M.D., LL.D., Sc.D., F.I.C.S., F.B.C.S., F.P.C.S. (Hon.), D.C.M., F.R.S.M.; fifth edition, 1960. Sydney: Angus & Robertson Ltd.; Philadelphia, Montreal: J. B. Lippincott Company. 10″ × 7″, pp. 668 with many illustrations. Price: £12 7s. 6d.

THE fifth edition of this book follows the now familiar pattern of multiple authorship, containing contributions from 23 specialists in addition to the author. The scope of the book is very wide, covering the whole field of surgery and all the surgical specialities excluding ophthalmology. Any discussion of such a vast subject within the brief compass of some 600 pages must clearly be a superficial one, but the author's aim is to emphasize some of the errors and dangers of operations, rather than to present a comprehensive textbook of surgery. The chapter on cardiac surgery is particularly lucid and well illustrated; that on the gall-bladder sets out the anatomical variations very clearly, and describes the author's method of electrocoagulation of the gall-bladder wall and adjoining bed.

The general principles which the author advocates are sound and instructive. He stresses the importance of a conservative approach, not only in the indications for surgery, but also in the actual performance of operations. He condemns the practice of carrying out "minor" operations in the office, since he considers that there is no such thing as "minor surgery". However, many techniques and statements in this book are open to criticism. For example, a persistent or hyperactive thymus gland is no longer regarded as a likely cause of unexpected complications. The choice of a pararectal incision for interval appendicectomy with the complete exclusion of McBurney's incision is certainly contentious, as also is the remark that leakage is more apt to follow end-to-end anastomosis than lateral joining of the intestine. One cannot accept the statement that "global mortality for removal of the gall-bladder by scalpel methods in unselected cases still ranges around ten per cent. or more". The advocacy of injection treatment for reducible inguinal hernias is quite contrary to modern teaching.

To sum up, this is an interesting and unusual book, which highlights some of the dangers of surgery and thus the means of preventing surgical failures and disappointments. It will be of most interest to undergraduates, but should be read with a critical approach, since it contains numerous opinions not in accord with British and Australian teaching. The book is extremely well set out, the print is clear and the numerous illustrations are of a very high standard.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Virus and Rickettsial Diseases of Man", by Sir Samuel Bedson, F.R.S., M.D., D.Sc., F.R.C.P., A. W. Downie, F.R.S., D.Sc., M.D., F. O. MacCallum, B.Sc., M.D., M.R.C.P., and C. H. Stuart-Harris, M.D., F.R.C.P.; Third Edition, 1961. London: Edward Arnold (Publishers) Ltd. 8½″ × 5½″, pp. 462, with illustrations. Price: 60s.

The Surgical Clinics of North America, Lahey Clinic Number: "Thoracic Surgery (Exclusive of the Heart)", Volume 41, Number 3, June, 1961. Philadelphia and London: W. B. Saunders Company; Sydney: W. Ramsay Surgical (N.S.W.) Pty. Ltd. 9″ × 6″, pp. 864, with illustrations. Price: £8 2s. 6d. yearly subscription (cloth); £6 15s. (paper).

"Oxytocin; Proceedings of an International Symposium held in Montevideo, 1959", edited by R. Caldeyro-Barcia and H. Heller; 1961. Oxford, London, New York, Paris: Pergamon Press. 8½″ × 5½″, pp. 444, with illustrations. Price: £5 net (English).

The Medical Clinics of North America; Memorial Sloan-Kettering Cancer Centre Number, "Medical Aspects of Cancer", edited by David A. Karnofsky, M.D., and Rulon W. Rawson, M.D.; Volume 45, Number 3, May, 1961. Philadelphia, London: W. B. Saunders Company; Sydney: W. Ramsay Surgical (N.S.W.) Pty. Ltd. 9″ × 6′, pp. 501-769, with illustrations. Price: £8 2s. 6d. yearly.

The Medical Clinics of North America, "Efficacy of New Drugs", edited by Howard F. Conn, M.D.; Volume 45, Number 4; 1961. Philadelphia, London: W. B. Saunders Company. 9″ × 5¾″, pp. 779-1101, with illustrations. Price: £8 2s. 6d. yearly.

"Inhaled Particles and Vapours; Proceedings of an International Symposium Organized by the British Occupational Hygiene Society, Oxford, 29 March-April 1960", edited by C. N. Davies; 1961. Oxford, London, New York, Paris: Pergamon Press. 10″ × 6¾″, pp. 496, with illustrations. Price: £5 net (English).

Pediatric Clinics of North America, "Symposium on the Newborn", edited by R. James McKay, Jr., M.D.; Volume 8, Number 2, 1961. Philadelphia, London: W. B. Saunders Company; Sydney: W. Ramsay Surgical (N.S.W.) Pty. Ltd. 9″ × 6″, pp. 410-652, with some illustrations. Price: £6 15s. yearly.

"The Year Book of Orthopedics and Traumatic Surgery", 1960-1961 Year Book Series, edited by H. Herman Young, M.D., with a Section on Plastic Surgery edited by Neal Owens, M.D., F.A.C.S., F.I.C.S.; 1961. Chicago: Year Book Medical Publishers. Sydney: W. Ramsay Surgical (N.S.W.) Pty. Ltd. 7¾″ × 5¼″ pp. 440, with illustrations. Price: 99s.

The Medical Journal of Australia

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MAN IN HIS ENVIRONMENT.

At the forthcoming Fifth North Queensland Medical Conference to be held in Townsville in June next, the main theme will, very appropriately, be "Man in the Australian Tropics". This theme is, however, even more appropriate than may appear at first sight, for Townsville was the birthplace in Australia of the systematic study of the effects of hot climates on man. There, in 1909, the Australian Institute of Tropical Medicine was established under the directorship of Dr. Anton Breinl, and during its comparatively brief existence—it was merged with the School of Public Health and Tropical Medicine in Sydney in 1930—it made a very substantial contribution to our knowledge of tropical physiology. Today, half a century later, the work done by Breinl, Young, Sundstroem and their colleagues is still held in high esteem. Though much of it was simple, even to the point of being pedestrian, it was done by men who were careful observers and painstakingly honest—the type of work which lasts. With the establishment of a Faculty of Medicine in the University of Queensland in 1936, the work begun at Townsville was continued under the guidance of the foundation Professor of Physiology, Dr. D. H. K. Lee, and the University of Queensland today is still a very active centre of research on the problems of adaptation to high environmental temperatures in both man and other mammals.

Environmental physiology is a subject which tends to come to the fore in periods of national emergencies, such as wars, and then when the crisis is passed to retreat again into the background. The widespread interest in it during the Second World War rapidly waned with the cessation of hostilities. At the present moment, however, it is very much in people's minds the world over, and particularly so in Australia. There are many reasons, some social, some political and some economic, why this should be so.

The present explosive growth of the world population is probably the gravest biological problem that man has yet had to face. To feed, or even to accommodate, this growing population will require a progressively more intensive use of all available land. Australia, with its large tracts of undeveloped territory, is vitally concerned in this problem. It does not help that much of this land is, at present, virtually uninhabitable and incapable of producing food—a fact conveniently overlooked by some of Australia's critics abroad—and that almost all of it suffers from the disabilities inherent in a hot, harsh climate.

The problem of increasing food productivity by improving water supplies and soil fertility and thereby increasing plant growth, because it is on plants that all animals, including man, directly or indirectly depend for food, is being intensively studied by governments the world over and by international instrumentalities, such as U.N.E.S.C.O. Australia is not lagging in this regard. Much work is being done here by the Commonwealth Scientific and Industrial Research Organization in particular, as witnessed by the papers presented at a very successful Arid Zone Technical Conference held under the auspices of the C.S.I.R.O. at Warburton in December last. At the same time, it has also come to be realized that Australia's economic prosperity is in no small measure dependent upon the exploitation of the mineral deposits of the far north of Queensland and the Northern Territory.

Progress along these lines is, however, entirely dependent upon the willingness of people to live permanently in these hot, arid or, at present, otherwise unattractive areas. They must do so of their own free choice because, as Bacon shrewdly observed under similar circumstances, "Plantation . . . must proceed from the option of the people, else it sounds like exile". But people will not choose to live there unless they enjoy some degree of thermal comfort. "Work in hot surroundings", said Sir Charles Martin, "demands a stout heart." They will also expect, and indeed they are entitled to, much the same amenities as they would enjoy in the more populous and climatically hospitable parts of Australia, and they will insist that their children should be as healthy and have the same opportunities for education and social advancement as they would elsewhere. To achieve these ends, much research is needed on many things, such as housing, clothing, air-conditioning and building design, but above all on the physiological problems of temperature regulation, acclimatization and the limits of thermal comfort.

It is a matter of some satisfaction, therefore, that there has recently been established an Environmental Health Section in the School of Public Health and Tropical Medicine in the University of Sydney to carry on, both in the laboratory and in the field, the work so ably begun in Townsville by Breinl and his colleagues. This Section begins its life under more auspicious circumstances than those at Townsville. Breinl records: ". . . On my arrival everything connected with the laboratory was in a very backward condition; the building set aside for the use of the Institute had been used as a storehouse and had to be cleaned and furnished for its future purpose. . . ." In the present instance, adequate funds have been provided by the Commonwealth Government through the Department of Health for the staffing and furnishing of the new laboratories. Among the scientific equipment provided is a climatic chamber in the form of a wind tunnel, which can simulate a wide range of climatic conditions and which, though by no means the largest in the world, is considered to be in refinement and accuracy of control second to none. Such standards are not achieved cheaply.

The work of the Section will not be confined to the tropics—mining and hot industries such as smelting, and even kitchens and laundries, provide examples of unfavourable hot environments occurring in temperate climates. It has been shown by many investigators that, in such industries, as the temperature and humidity increase, so do the number of accidents, the incidence of absenteeism and the turnover in employment, and there is a decline in the quality and total output of work. The advance of industrialization in this country will make these matters progressively more important.

It would be wrong, however, to believe that our problems in environmental physiology, which includes the physiology of temperature regulation as a whole, are confined to those associated with protection from the effects of excessive warmth. The increasing use of hypothermia as an adjunct to surgery, and the recent report in this Journal of a series of cases of neo-natal cold injury at Newcastle,[1] serve to remind us of the importance also of the physiological effects of loss of heat from the body. An understanding of the effects of cold, and especially intense cold, is important in another context also. Australia has growing interests in the continent of Antarctica, the ultimate extent of which it is difficult to foresee. It is, therefore, pleasing to record that the physiology of exposure to cold is receiving increased attention by the Australian National Antarctic Research Expeditions. The maintenance of our international status in polar research requires that this work should be energetically pursued. It is to be hoped, especially in these days when, perhaps, we stand at the threshold of interstellar travel, that the pressing needs of tropical physiology will not obscure the significance for us of the other end of the temperature scale. Man's reactions to intense cold are in many ways as important as his reactions to extremes of heat.

Comments and Abstracts.

VIRUS MENINGO-ENCEPHALITIS.

FROM time to time the Ciba Foundation arranges conferences of scientists, who are invited to attend, according to their preeminence in the field of investigation to be discussed. The papers presented are published in one volume as soon as possible after the conference, and there is also included a transcript of the comments and discussion which each paper stimulated at the meeting. The Ciba Foundation reports thus represent the most recent views of leading scientists in any one field.

For many cases of aseptic meningo-encephalitis a cause still cannot be found; but during the last decade, a small proportion of such cases have been shown to be due to known viruses. If we exclude the three types of poliomyelitis virus, the commonest agents in temperate regions are the Coxsackie viruses and the ECHO viruses. The only arthropod-borne encephalitis viruses known to occur in Europe are tick-borne. Japanese B encephalitis virus is one of the well-known arthropod-borne encephalitis viruses which occur outside Europe; it is closely related to the Australian Murray Valley encephalitis virus. Other viruses of more general distribution, and producing aseptic meningitis, are the viruses of mumps, herpes simplex and lymphocytic choriomeningitis (LCM).

These viruses were the subject for discussion at a recent Ciba Foundation Study Group, and the report of this conference is now to hand.[1] In it the subject is dealt with in simple and authoritative terms, and clinical, epidemiological, pathological, diagnostic and prophylactic aspects are considered. Thirteen full papers and their discussions are presented. The penultimate paper considers post-infectious virus encephalitis. The last paper discusses the neurological complications of Behcet's disease. The whole volume is eminently readable, and should appeal to both research workers and medical practitioners. The latter will be particularly interested in the statements that the ætiology of the non-paralytic aseptic meningitides usually cannot be determined by clinical examination, and that, especially with Coxsackie and ECHO viruses, serological methods of diagnosis would involve an inordinate amount of work. Virus isolation is the best index of ætiology, though even this may not be considered an absolute criterion.

NEW LIGHT ON LAENNEC.

ONE of the most illustrious figures in the annals of medical history is Réné Théophile Hyacinthe Laennec, and it is common knowledge that he showed the way to attain greater precision in physical diagnosis by his invention of the stethoscope and his efforts to achieve perfection in the art of auscultation. Osler summarized his contribution to medicine in this way:

> The discovery by Laennec of the art of auscultation, by which, through changes in the normal sounds within the chest, various diseases of the heart and lungs could be recognized, gave an immense impetus to clinical research. Laennec's contributions to the study of diseases of the lungs and of the heart and of the abdominal organs really laid the foundations of modern clinical medicine.

It is fairly well known that this great physician for a long time suffered from pulmonary tuberculosis, and that eventually he died from the disease at an early age. But often there are less dramatic incidents in the life of a strong character which play a vital part in shaping the pattern of his career. Until now we have heard little of Laennec's strange family background, the unceasing attachment to and longing for the peacefulness and beauty of his native heath in Brittany, the intimate details of his private life, his endless struggles against persistent ill health and parental neglect, his constant anxiety over financial embarrassment, and the painful scars left upon his sensitive and immature mind by many harrowing experiences during the Reign of Terror in Brittany.

Many different phases in the career of this gentle, noble and courageous personality are now revealed in the English translation of a book written with insight, imagination and historical accuracy by Dr. Roger Kervran,[2] who himself has made a life study of tuberculosis, and is thoroughly versed in the history of Brittany as well as in the difficult dialect of the Breton people.

It is an amazing fact that for most of Laennec's short life, France was in the toils of bloody revolution or at war with England and other European States, or its internal economy was being undermined by political, religious or social disturbances, while its famous academic institutions were being alternately dismantled or restored as new factions suddenly appeared upon the scene to assume temporary power. Yet, in the midst of all this chaos and internal strife, France led the world in many departments of the medical and allied sciences.

When Laennec went to Paris in 1801 to study anatomy and surgery, he became closely associated with Xavier

[1] R. B. Morris *et alii*, 1961, MED. J. AUST., 2: 269 (August 12).

[1] "Virus Meningo-Encephalitis: Ciba Foundation Study Group No. 7", edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., M.R.C.P., and Margaret P. Cameron, M.A.; 1961. London: J. & A. Churchill Ltd. 7¾" × 4¾", pp. 120. Price: 12s. net (English).

[2] "Laennec: His Life and Times", by R. Kervran, M.D., translated from the French by D. C. Abrahams-Curiel; 1960. Oxford: London, New York, Paris: Pergamon Press. 8½" × 5½", pp. 220. Price: 21s. net (English).

Bichat, who had based his work upon that of Haller and Morgagni, and who was the first to correlate normal and pathological anatomy with the symptoms and signs elicited at the bedside. Laennec became a pupil of Jean Nicholas Corvisart, the brilliant teacher who reintroduced Auenbrugger's method of percussion; he became friendly with Georges Cuvier, the famous biologist and palæontologist, and with Gaspard Laurent Bayle, who was to throw much light on the problem of tuberculosis before dying of the disease himself in 1816, and he knew Pierre Louis, who introduced the statistical method into clinical research. But, like many of his contemporaries, he found himself at loggerheads with the irascible Guillaume Dupuytren, the leading surgeon and anatomist of his day. These young men of genius made their discoveries with the help of Bichat's teaching in morbid anatomy and their own astute observation of patients in the hospital wards.

It is interesting as a study of character to read of Laennec's private and professional relationships with these rising stars in the French medical firmament, of the constant setbacks to his advancement and to the acknowledgement of his genius in the highest academic and medical circles of Paris, of his notable work as editor of the *Journal de médecine*, of his serious conversion to religion through a realistic awareness of and reliance upon spiritual values, and of his final achievement in setting out many new principles of theory and practice for a better understanding of common diseases of the heart and lungs.

Dr. Kervran makes this comment on Laennec as he was climbing the ladder to fame:

> This man of thirty years of age had displayed as much intelligence, energy, work and skill as any man could. He had seen destiny undermine his health, overwhelm him with physical miseries and complicate his undertakings at will. Already he had begun to feel that even his humble dreams of retiring to Brittany would not be realized in time. He neither complained nor became indignant. The one regret he did express was that now he also saw escaping him the means of helping his father, who had, still did and would always trick him. From whence did this serene nobility and Christian spirit spring? Occidental fatalism or the resignation of a sick man? It is very difficult to tell.

Dr. Thomas Addison always held that Laennec contributed more towards the advancement of the medical art than any other single individual. Most of us can also derive some benefit from learning of the spiritual, worldly and human influences which lay behind his great struggle and achievement.

SHORTER ABSTRACTS.

THERAPEUTICS.

CLINICAL EXPERIENCE WITH GUANETHIDINE IN THE TREATMENT OF HYPERTENSION. J. J. Kelly *et alii, J. Amer. med. Ass.*, 1961, 176: 577-580 (May 20).

THE authors report their experiences with guanethidine in the treatment of 16 severely hypertensive patients, who had previously taken other medication without success. The drug reduced both systolic and diastolic pressure in 14 of the 16 patients, progress being followed for one to eight months. There were minimal side effects, such as diarrhœa in three cases, and no toxic manifestations. No tolerance developed, but adjustments of dosage had to be made in steps of 10 mg. at intervals of three to four days. Addition of chlorothiazide to this therapy made it possible to maintain the desired levels of blood pressure with half the previous dosage of guanethidine. No evidence of comparable synergism was obtained when rauwolfia derivatives were tried. The authors suggest that guanethidine may replace ganglion-blocking agents in the treatment of severe hypertension; preliminary studies on combination therapy with rauwolfia and thiazide derivatives indicate that this may be the ideal way to use the drug. They state that because the drug is extremely potent, it is necessary that the patient should be cooperative and intelligent in its use. Frequent evaluation by the supervising physician is necessary, with adjustment of the dosage to obtain maximum benefit. They therefore recommend that guanethidine should be used only in cases of severe hypertension after other drug therapy has failed.

GUANETHIDINE—REPORT OF A CLINICAL TRIAL. J. A. Lewis, *Canad. med. Ass. J.*, 1961, 84: 183-187 (January 28).

THE author reviews the literature and reports a clinical trial involving 28 hypertensive patients treated with guanethidine. He stresses that the effects of this drug are produced gradually and dissipate slowly. Diarrhœa and weakness of the limbs were the most frequent side effects; peptic indigestion developed in one patient. No evidence of tolerance was observed during the period of this trial. The author concludes that the introduction of selective sympathicolytic drugs constitutes a significant advance in the treatment of severe hypertension and may replace the long-term use of ganglion-blocking drugs. A combination of the rapid-acting, totally absorbed pempidine with guanethidine in the induction of treatment of malignant hypertension is considered safe and of value.

THE EFFECT OF GUANETHIDINE IN THE TREATMENT OF HYPERTENSION. M. Stevenson *et alii, Amer. J. Cardiol.*, 1961, 7: 386-391 (March).

THE authors have studied 25 patients with chronic hypertension who were treated with guanethidine for periods ranging from six to eight weeks. Blood pressure reduction with postural hypotension was observed in all patients. The action of the drug appeared to be similar to that of reserpine in blocking the release or action or distribution of noradrenaline at sympathetic end-organs. The maintenance dose ranged from 5 to 175 mg. per day. Nausea, vomiting and diarrhœa were noted in some patients. It is concluded that guanethidine may be a useful supplement to other hypotensive agents but has little place in the treatment of hypertension when used alone.

ERYTHROMYCIN IN TREATMENT OF EARLY SYPHILIS. C. H. Montgomery *et alii, Arch. intern. Med.*, 1961, 107: 732-735 (May).

IN this article the author discusses the effect of erythromycin in the treatment of early syphilis on the basis of a study of 148 primary and secondary cases. It was found that erythromycin stearate in the dosage of 9 to 10 grammes given over a three-day or five-day period respectively, is unsatisfactory for the treatment of early syphilis. Erythromycin stearate or erythromycin propionate in a dosage of 10 grammes given over a ten-day period is probably not adequate as routine therapy for early syphilis. The use of 20 grammes of either erythromycin stearate or propionate may prove satisfactory for the treatment of early syphilis. On the basis of preliminary observations, erythromycin propionate appears equally as good as, if not superior to, erythromycin stearate.

DEMETHYLCHLORTETRACYCLINE AND TETRACYCLINE. C. E. Robert, jun. *et alii, Arch. intern. Med.*, 1961, 107: 104 (February).

WHEN demethylchlortetracycline (DMCT) became available for use in 1959, early studies showed it to be more resistant to acid and alkali degradation than other tetracyclines and generally more active against bacterial pathogens than tetracycline. It was less well absorbed from the gastro-intestinal tract than tetracycline, but its serum half-life was 44% greater than that of tetracycline, and its renal clearance only 43% of that of tetracycline. It was therefore recommended that 0·15 gramme of DMCT given four times daily would be equivalent to 0·25 gramme of tetracycline similarly given. The present study set out to determine the respective serum levels of the two drugs obtained by the doses recommended. The test organism was a group B staphylococcus, which was known to be almost twice as susceptible *in vitro* to DMCT as to tetracycline, as is the case with most pathogens for which the tetracyclines are used. It was found that much lower serum levels of DMCT were obtained than of tetracycline. This was probably due to its lower absorbability from the gastro-intestinal tract and its lower dosage. In contrast to previous claims, the expected "extra day" of therapeutic serum levels after the cessation of its administration (due to the slower excretion) was not demonstrated, and under the conditions of the study in-vivo binding of DMCT by serum protein was obvious. The authors conclude that the recommended

dosage of DMCT is not sufficient to give serum therapeutic levels equal to those of the usual dose of tetracycline, but that the high gastro-intestinal toxicity of DMCT may prevent its use in doses equal to those of tetracycline.

THE USE OF INJECTABLE DEXAMETHASONE ACETATE IN RHEUMATIC DISEASES. G. Gaudin, *Presse méd.*, 1961, 69: 429-430 (February 25).

THE author states that the efficacy of intraarticular injections of cortisone derivatives in the treatment of rheumatism no longer requires proof. Comparison of hydrocortisone, of "Hydrocortancyl" and of injectable dexamethazone in rheumatic disorders showed that dexamethazone acetate generally produced a faster result, the good effect being most frequently observed immediately after the first injection. The action also seemed of longer duration. The drug is very well tolerated, much better than hydrocortisone and slightly better than "Hydrocortancyl". For this reason the author considers that it should be preferred particularly in localized joint disease and in resistant rheumatic lesions, such as frozen shoulder and some painful hip lesions. Its anti-inflammatory effect suggests its use in small lesions, such as nodules, tendinous or otherwise, which will take only a small volume of fluid. Its use on the relapses of rheumatoid arthritis allows a reduction in the amount of corticoids administered orally. The author concludes that the superiority of dexamethasone acetate lies in its better tolerance, its faster action and its wider effectiveness, which in turn result from its greater anti-inflammatory activity and its slower elimination.

RISTOCETIN IN BACTERIAL ENDOCARDITIS. M. J. Romansky *et alii*, *Arch. intern. Med.*, 1961, 107: 480 (April).

THE authors state that the three major advances in the treatment of bacterial endocarditis have been: firstly, the discovery of penicillin; secondly, the demonstration of the good results obtainable by a combination of penicillin and streptomycin; and thirdly, the success of short-term therapy with ristocetin, first reported by Romansky and Holmes in 1957. In the present study 15 patients with bacterial endocarditis were given daily doses of 2 grammes of ristocetin by the intravenous route for an average of 14 days. Ten of the patients had enterococcal endocarditis and all of these responded well to ristocetin; four had previously had massive amounts of penicillin and streptomycin in combination, and three had shown very poor responses to other antibiotics. In the one case of staphylococcal endocarditis the organism was penicillin-resistant, but the patient was cured by ristocetin. *Streptococcus viridans* was incriminated in two cases only, and both patients recovered on ristocetin therapy. In two cases no positive blood cultures were obtained. One patient responded well and the clinical picture of the other was complicated by other factors. The authors believe the occasional side-effects, such as skin rashes, drug fever, mild phlebitis and transient leukopenia, can be eliminated by fairly rapid administration of a smaller dose in solution at twelve-hourly intervals. They conclude that the excellent results obtained with ristocetin as opposed to other antibiotics in enterococcal and staphylococcal endocarditis may be due to its greater ability to penetrate into the encapsulated lesions caused by these organisms and perhaps also to the small range between the bacteriostatic and bactericidal doses. They name short-term ristocetin therapy as the treatment of choice in enterococcal endocarditis and compare their results with the 15% to 70% relapse rates found by other workers using penicillin and streptomycin for long periods.

ERGOTAMINE TARTRATE INHALATION: A NEW APPROACH TO THE MANAGEMENT OF RECURRENT VASCULAR HEADACHES. W. G. Speed III, *Amer. J. med. Sci.*, 1960, 240: 327 (September).

ERGOTAMINE TARTRATE is acknowledged to be the most effective remedy for vascular headaches, but its efficacy depends on an adequate blood level being achieved and on its administration as early as possible during the attack. Since oral administration is not particularly effective, the parenteral or rectal routes are used, and these have obvious disadvantages. In the present study the author investigates the effectiveness of a "Medihaler", an aerosol device designed to deliver an accurate dose of ergotamine tartrate with each depression of a valve. Three groups of patients were studied: (i) sufferers from migraine; (ii) sufferers from histaminic cephalalgia (Horton's syndrome); (iii) sufferers from tension headaches. In all, 65 patients were studied and 700 headache evaluations were made. The combined excellent and good results in the migraine group totalled 91·3%, those in the Horton's syndrome group 84·6% and those in the tension headache group 83·2%. About 40% of the patients had received ergotamine tartrate previously by other routes and in most cases the relief received from the "Medihaler" was more rapid (10 to 30 minutes as opposed to 90 minutes or more in the case of oral preparations) and in some cases more complete. The author concludes that the inhalation method of administration is at least as good as the subcutaneous injection or rectal suppository method, and better than the oral, for the reason that it enables a therapeutic blood level to be achieved more quickly—a vital factor in the relief of the attack—and it is more convenient than the former two, since privacy and skill are not required for its use.

USE OF LOCAL INJECTIONS OF CORTICOSTEROID INTO CUTANEOUS LESIONS. F. Kalz and H. Prichard, *Canad. med. Ass. J.*, 1961, 484-486 (March 4).

THE authors report that they have injected corticosteroid preparations into the skin lesions of a number of diseases in 208 patients with uniform success. Of these patients 79 had superficial acne, 20 deep pustular acne, 22 simple cystic acne and 34 chronic acne with multiple and conglobated cysts, while others had lesions of psoriasis, annular granuloma, keloid, lichen planus and Dupuytren's contracture. The most effective preparation used was 6-methylprednisolone in wax.

HYGIENE.

SMOKING HABITS OF CANADIAN CHILDREN. J. B. Morison and H. Medovy, *Canad. med. Ass. J.*, 1961, 84: 1006 (May 6).

THE authors present a study of the smoking habits of 21,884 Canadian school pupils, 11,275 boys and 10,609 girls. In the twelve-year age group 55 out of 1622 boys smoked from one to four cigarettes per day and 10 smoked 20 or more per day. In the sixteen-year age group 60 out of 1243 boys smoked from one to four cigarettes per day, but 383 smoked 20 or more per day. At 16 years 47% of the boys and 33% of the girls were smokers. If both parents or either parent smoked, 29% of the boys and 18% of the girls were smokers; if neither parent smoked, 21% of the boys and 11% of the girls were smokers. Amongst the more intelligent children the incidence of smoking was less than half the average, while amongst the slow learners the incidence was more than one and one half times the average. The effect of intelligence on the incidence of smoking was more pronounced in the girls. The authors conclude that health education to prevent the adoption of the smoking habit must begin earlier than has been the practice if it is not to be too late to have any effect.

CLUSTER TESTING—A NEW DEVELOPMENT IN SYPHILIS CASE FINDING. W. J. Brown, *Amer. J. Publ. Hlth*, 1961, 51: 1043-1048 (July).

THE author describes a new development in syphilis case finding known as "cluster testing". This is an extension of epidemiology to include examination of two kinds of associates other than "sex contacts" of infected persons. Until recently venereal disease control depended on education, selective blood testing and contact tracing. In contact tracing infected persons are asked to name persons associated with them who have been "sex contacts" during the period from the beginning of the incubation period of their disease until they are rendered non-infectious by treatment. These "contacts" are then located, examined and treated if necessary. The group brought to examination by this method contains a larger percentage of early infectious cases than any other group associated with an infected person. However, in addition to "sex contacts" there are two other groups who constitute the "cluster" usually associated with an infected person. They are "suspects" and "associates". Suspects are persons who the infected person thinks may be also infected, and associates are friends or social acquaintances of the infected person or of those he has named as contacts or suspects. In investigating these persons the author stresses the value of being prepared to take a specimen of blood immediately consent is given. When members of a cluster are found to frequent an area, a social centre or some such similar meeting place the author recommends mass blood testing of all those fre-

quenting such places. Many persons not in "clusters" have been found to have infectious venereal disease by this means. The author considers that the application of cluster testing will reveal more cases of infectious venereal diseases in less time than any other method and that the earlier treating of them will further reduce the number of persons infected by them.

BREAST FEEDING PRACTICES: SOME IMPLICATIONS OF REGIONAL VARIATIONS. W. O. Roberts, *Amer. J. publ. Hlth*, 1961, 51: 1035-1042 (July).

To discover factors that influence a mother's decision to breast feed or bottle feed her infant the author analysed certain relative data collected by a nation-wide mail questionnaire survey. Questionnaires were sent to 1500 mothers, and 1275 completed questionnaires were returned. At the age of one week, 30% of infants were completely or partially breast fed. At the age of 18 weeks only 7% were being breast fed. Regional location of the maternal residence was found to be associated with the most significant variations. The incidence of the breast feeding in one State was 16%; in other States, 44%. Differences in social class and maternal parity were also associated with significant contrasts in incidence. Among mothers in the "middle class" it was below that found in both "lower" and "upper" classes. Mothers of first children attempted to breast feed their infants significantly more frequently than multiparous mothers (38% and 27% respectively). Variation in maternal age, urban or rural residence, and whether the infant was under the care of a pædiatrician or general practitioner were not correlated with significant differences in incidence of breast feeding at one week of age. It is concluded that a complex of cultural factors, rather than a particular personality pattern in the mother or the specific attitude of her attending physician, influences her choice of feeding technique. No seasonal variation in breast feeding incidence was found in a similar survey six months later.

THE EFFECT OF DIFFERENT TYPES OF COOKING ON ARTIFICIALLY INFECTED MEAT. P. K. Sylvester and J. Green, *Med. Offr*, 1961, 105: 231-235 (April).

THE authors report the results of an investigation to determine the effect of cooking on organisms placed in and on meat prior to cooking. Joints of meat were heavily infected with heat-resistant *Clostridium welchii, Salmonella typhi-murium* and staphylococci. Some of the joints were roasted in the orthodox manner and some overnight. The temperatures of each joint were recorded in the centre and on the surface during the experiments by a multipoint temperature recorder. *S. typhi-murium* and staphylococci were killed during both methods of roasting. *Cl. welchii* appeared to survive in the overnight roasting experiments to a greater extent than in the orthodox roasting experiments. Experiments were also conducted on the survival of *Cl. welchii* during overnight stewing of meat artificially infected with a heavy growth of these organisms. The over-all result from these experiments was inconclusive, but *Cl. welchii* was easily recovered after one experiment.

During the overnight roasting the centres of the roasts reached a temperature of 150° F. in from six to nine hours and remained about that temperature for a further six to nine hours. The overnight stew reached a temperature of 170° F. in two hours and remained at that temperature for the remainder of the night. Sixteen samples of gravy made from the juice of unadulterated meat stewed overnight were also taken, but no *Cl. welchii* were isolated from any of them. The authors consider that overnight cooking of meat may be quite safe if the meat is eaten immediately after cooking, but orthodox cooking seems to be more effective in killing *Cl. welchii*.

FIRST DOMESTIC WASTE STABILIZATION POND IN PENNSYLVANIA. A. D. Sidio *et alii, Publ. Hlth Rep.* (*Wash.*), 1961, 76: 201-208 (March).

THE authors outline the development of stabilization ponds for the treatment of raw domestic sewage in Pennsylvania, and show that these ponds function satisfactorily in areas that are not arid and do not have high evaporation rates. For adequate treatment, time, dilution, and oxygen are necessary. Organic matter is stabilized as a result of a cycle established between bacteria and algæ in the pond. In the presence of adequate oxygen, bacteria break down organic matter to simple substances and carbon dioxide. By means of photosynthesis, algæ, in the presence of light, convert these substances into more complex substances with the release of oxygen. Based on the temporarily established load levels of 175 persons per acre of lagoon surface area the following observations were recorded. The minimum biochemical oxygen demand reduction was 87%. Algal growth rapidly reached a maximum level of one million cells per millilitre. Hydrogen sulphide gas levels remained at an acceptable level except on two occasions, when odours were detected in the immediate vicinity of the pond. The reduction of coliform organisms was more than 99%. Preliminary studies indicate a complete removal of the salmonella enteric pathogens. The authors consider that this method of sewage treatment is specially suitable where no regular sewerage systems are available and where topographic and climatic conditions are appropriate.

CURRENT STATUS OF FOOD POISONING CONTROL. L. Buchbinder, *Publ. Hlth Rep.* (*Wash.*), 1961, 76: 515-520 (June).

THE author draws attention to the lack of progress in food sanitation as shown by the reported incidence of bacterial food poisoning and the frequent occurrence of outbreaks that are not reported. Four factors involved in the control of bacterial food poisoning are susceptible persons, micro-organisms capable of causing food poisoning, food capable of supporting the growth of micro-organisms, and a combination of temperature and time permitting their growth.

In comparison with other foods the sanitary control of water and milk has proved comparatively effective and simple because of the few people involved (one authority may control sterilization of water for a whole State or town) and because of the ease with which both water and milk can be processed in a closed system and finally sterilized. As a result, the incidence of diseases transmitted by water and milk has been reduced almost to vanishing point. There is no evidence, however, that the incidence of food poisoning and diseases due to organisms in other types of food has decreased. The authors attribute this to the following reasons: Enclosed processing and terminal sterilization are not practicable with many types of foods. The large number of food handlers and food processing places makes close supervision practically impossible. Standard bacteriological tests for food other than milk and water have not been developed or applied. There is no insistent public demand for adequate food protection services. Many public health administrators are not aware of the need for better food sanitation.

The author suggests, as a solution to the problem, the formation of a national study committee to direct research in food control on a continuous and coordinated basis with power to apply the results of research.

ENTERIC VIRUSES IN WADING POOLS. S. Kelly and W. W. Sanderson, *Publ. Hlth Rep.* (*Wash.*), 1961, 76: 199-200 (March).

THE authors give details of the isolation of two types of ECHO viruses from three of four municipal outdoor wading pools that were investigated. Type 3 was isolated from two pools and type 11 from a third pool. These were the predominant types in raw sewage from the municipality concerned at that time. An indication of fæcal pollution was given by estimations of the most probable number of coliform bacteria per 100 ml. in samples taken from each pool. This number varied from less than 30 before use to 9300 in the afternoon after use. Viruses were not isolated from the pool with the lowest coliform density. Viruses were not isolated from samples of water from chlorinated swimming pools during the same period in the same area. This suggested to the authors that wading pools should also be chlorinated.

CADMIUM POISONING FROM A REFRIGERATOR SHELF USED AS AN IMPROVISED BARBEQUE GRILL. T. D. Baker and W. J. Hafner, *Publ. Hlth Rep.* (*Wash.*), 1961, 76: 543-544 (June).

THE authors report that a cadmium plated refrigerator shelf used for the first time as a barbeque grill apparently caused cadmium food poisoning in a family of two adults and two children. The symptoms—headache, nausea, and vomiting—were similar to those of poisoning caused by ingestion of a toxic chemical and, more specifically, of cadmium. Recovery was spontaneous and without sequelæ. None of the food cooked on the grill was available for analysis but the metal plating on the grill had scaled off and the base metal was visible in a number of places.

Points of View.

REHABILITATION — A GOAL OF PUBLIC HEALTH: AN AUSTRALIAN POINT OF VIEW.

SIR GEOFFREY VICKERS asks: "What sets the goals of Public Health?"—and answers: "When we open our eyes to the scene around us we find the goals already set. Policies are being implemented, institutions are in action with all the historical momentum of buildings and establishments. Men are in mid-career, budgets have acquired prescriptive rights. This dynamic configuration is resistant to sudden change."

He went on to conclude: "History sets the goals of public health", elaborating that "amongst the forces which make history one of the most obvious is human need", and that "to some extent at least, techniques set the goals of public health. For techniques not only enlarge our responses; they mould our expectations"; and also that "ideology sets the goals of public health" (Vickers, 1958).

It is my purpose to show wherein, if these observations be true, they are true for rehabilitation. To do so requires acquaintance, though superficial, with the past.

Frank, a Bavarian physician of the first half of the nineteenth century, wrote a book in which he considered the life of man as it evolved in its physical and social environment from the moment of conception to the moment of death. In doing so he provided the basis for the British theory of the relationship between medicine and the social *mores*.

In Britain at this time many notable characters of history championed the cause of public health. Chadwick, administering the Poor Law, grasped the connexion between poverty and ill health and acted accordingly. Dickens, Kingsley, Disraeli, Carlyle, Tennyson, Elizabeth Barrett Browning and, lest we forget, Engels lent their literary efforts in informing their reading public of the "wretchedness, disease and depravity" that constituted the medico-social conditions surrounding the "dark Satanic mills" of England of the industrial revolution (Bryant, 1940).

Lord Shaftesbury, "The Children's Friend", after much effort successfully delivered Parliament of its first *Public Health Act*, that of 1848. Fifty years later the first British chair of public health was instituted in the University of Edinburgh, its creation said to have been inspired partly by Pasteur.

Sanitary reform and the fledgling science of bacteriology were thus receiving attention, and by the turn of the century public health had emerged as a separate branch of medicine. It concerned itself mainly with sanitation and with forensic medicine.

Concurrently with the birth of public health, opinion was being formed, mainly on the Continent, built upon the foundations laid so soundly by Frank, that the health of the people was a matter of direct concern to society; that society had an obligation to protect the health of its members; that social and economic conditions had an important effect on health and disease, and that this relationship should be subjected to scientific investigation. It was in these thoughts that the discipline known as social medicine took its origin. Between public health and social medicine there is much in common, but in the latter the emphasis is on the "welfare aspects of contemporary medical practice" (Stewart, 1959).

Gradually medical schools came to give it increasing attention, that of the University of Queensland being one of the first in the British Commonwealth to establish a chair in the subject.

John B. Grant, of the Rockefeller Foundation, has stated with justifiable metaphor that social medicine may be considered as coming under three headings: social physiology, social pathology and social therapy. Undergraduates at Edinburgh and Manchester now learn something of social medicine in the general practices of their respective medical faculties.

Again, in the "continuity clinics" of the faculty of medicine of Western Reserve University, under the supervision of the internist, the clinical student is given long-term training and increasing responsibility for the care of several chronically ill and disabled patients, acquiring in the process a proper "approach to comprehensive care". This successful measure was evolved to bridge the gap between the type of medicine usually practised in the teaching hospital and that required outside (Caughey, 1957, 1959).

It is probably no exaggeration to say that the fate of the medical profession, and so the education of its future members and the type of service they will provide, is determined in any one epoch by the wisdom of the representatives of society so to endow and authorize medical and hospital practice that it can provide comprehensive care for the individual patient. A suitable definition of the term comprehensive care (Krusen, 1957) may be set out in the following manner.

Comprehensive care entails (i) medical and surgical diagnosis and treatment which must continue beyond the end of the acute stage of the disease or injury, to the point of maximal reduction of physical or mental disability; (ii) social service; (iii) vocational counselling and vocational training (when possible); (iv) job placement.

Social Medicine and Rehabilitation.

It can now be shown very briefly that rehabilitation is a specialized form of social therapy, or if you will, of applied social medicine, based to an important and significant extent on physical medicine.

In 1935 Dr. F. H. Krusen established the Section of Physical Medicine and Rehabilitation in the Mayo Clinic, Rochester, Minnesota, and under his guidance that which was worth while in physical medicine was gradually scientifically validated, and the hocus-pocus exposed and discarded. Similar work was done in certain other large centres elsewhere.

The accelerated scientific progress of the years of World War II added impetus to this work. These years also saw the rebirth of the pioneering spirit and deeds of Sir Robert Jones, and their application to the convalescent care of servicemen.

As was said of the medicine practised by Sir Robert Jones in the 1920's: "Every member of the hospital team had to be fully informed of the social implications of each patient's condition . . .; graduated physical exercise . . . education and occupation were fundamental therapeutic aids" (Capener, 1959). It has taken a generation for the wheel to have turned full circle.

Gradually and inevitably, these two streams of effort—rehabilitation and its basic component physical medicine—coalesced. The formation of a new section of organized medicine—"Physical Medicine and Rehabilitation" was the result. This section is now better termed "Rehabilitation Medicine", for, commencing as one dealing mainly with medically supervised physical therapy, it soon and irrevocably became involved in what Grant has termed "social therapy"—or the over-all management of a patient.

It should be noted that this over-all management is not of a local disease or deformity, but of a patient's illness or injury. It includes the means of overcoming these departures from health in such a way that the patient may be restored to a suitable normal activity. The normality of this activity must have regard, not only to the patient's abilities and disabilities, both mental and physical, but also to his environment—educational, vocational and social. Equally importantly, the specialty is best practised by the well-trained clinician (rather than the neophyte) also enlightened in the techniques of rehabilitation.

The Concept of Immunity—and a Caution.

Sir Geoffrey Vickers emphasized this aspect in an interesting way: "In keeping with the concept of immunity and vulnerability there is a need for a dual approach—on the one hand, to reduce the hazards of the environment and on the other, to increase the immunity of the individual." This dual approach, whether one likes it or not, comes to underlie and influence the activities of a rehabilitation unit as a routine, although not of course exclusively.

Recently the Director of the Health Service of Harvard University was quoted as saying: ". . . attention to social factors conducive to illness may produce more effective results in the long run than too exclusive an emphasis on the treating of the sick", and the remark was offered: "This redirection of emphasis seems not only characteristic of adolescent medicine but inherent for the whole philosophy of modern medical practice" ("Current Comment", 1959).

The need for this redirection of emphasis or dual approach is no longer being ignored, but it must receive increasing recognition. However, it should be noted that only a soundly based system of medical practice can ensure that the tail of over-all management will never wag the dog of exhaustive physical diagnosis. The latter must precede the former. The two are supplementary.

The wheel which turned full circle has done so at a time of great stresses. These are created by many factors. There are shortages of hospital beds and of ancillary staffs. At the same time some lay administrators are empowered to exercise control of medical and hospital policies; an undue spirit of professionalism at times possesses some ancillary groups; whilst drawn into the quiet turmoil of rehabilitation medical practice there is an ever-increasing flow of lay-workers, not without some self-exploratory eagerness (and yet sense of dedication), but at times lacking any professional training sufficient for them to work always harmoniously or even effectively in the academic and ethical *milieu* created by that doctor-patient relationship "essential to all good clinical work".

In view of all this, an American cautionary comment is timely:

> The data show, and experience confirms, that patients do not simply graduate from a medical phase to a vocational phase of rehabilitation and thereby leave the services of a physician. In many instances there is need for concomitant medical therapy in the vocational phase. In all instances the new vocational environment requires a special form of medical assessment and interpretation of the disability, not only to the patient, but also to the vocational workers (Gorthy *et alii*, 1959).

Basic Concepts of Rehabilitation.

For those who would understand the implications of the term rehabilitation, important fundamental concepts must be appreciated.

First, rehabilitation is new only as an organized section of modern medical and hospital practice. Otherwise it is as old, and as universal, as the art of medicine itself. Second, rehabilitation is not necessarily the third of separate consecutive phases of medical care. Rehabilitation is a process which operates in some manner for all patients, commencing at the first point of contact of the patient and his doctor. The specialized facilities of a rehabilitation department are required for a relatively small but significant proportion of the patients of a hospital, or of any one practitioner. Only if adequate staff, area and organization are available can these necessary facilities exist. The specialization involved is one of professional knowledge and experience on the one hand, and of business economy in hospital practice on the other (Meyers, 1959).

Third, rehabilitation is no more a narrow specialty than is internal medicine or general practice. Properly practised it is a branch of medicine, an integral part of the whole, so that anatomy, physiology, pathology and psychology, in their ancient truths and recent advances, serve it equally well as they also serve internal medicine, general practice and the specialties.

Fourth, it is because so great a proportion of the patients requiring specialized rehabilitation have some chronic illness or disabilities involving the neuro-muscular systems and locomotor apparatus that rehabilitation must be based upon, and must incorporate, the physiotherapy and occupational therapy units—that is, that rehabilitation can function adequately only when it is in effect practised by a department of physical medicine and rehabilitation (Meyers, 1957).

The fifth point is that, in addition, so that rehabilitation may assist each patient to achieve a suitable normal activity, not only an almoner service, but also facilities for training in activities of daily living, and in certain educational and vocational skills, must be available. They are often required concurrently.

The sixth point is that in principle, and as Sir Robert Jones (1925) demonstrated, the needs of any rehabilitation unit are: (i) skilled, full-time medical direction; (ii) space which is adequate in area, unified and accessible; (iii) suitable staff and simple equipment; (iv) organization.

Seventh, the community as a whole is concerned with rehabilitation in many ways, but rehabilitation can be carried on adequately only under direct and detailed medical supervision—that is, in a medical environment—and in the metropolis, necessarily in major teaching hospitals. Where required, these facilities can be supplemented by (separate) rehabilitation centres (Campbell, 1957; *Social Services Act*, 1948).

Conclusion.

Social aims are brought about by countless human needs definable only in terms of our ill or injured fellow-man's ability to contend with his environment. This much history has shown if we will but read it.

These are the human needs which have set rehabilitation as a goal of public health—a goal which requires much to be done, promptly and wisely, if these needs are to be satisfied and a critical and lasting point scored for the common weal.

"Social policy must influence practice, but it must never dominate it. . . . The third revolution (in medicine) is now in progress; it involves the precise relation of medical practice to society and it is the task of this generation to find the solution of the problems that it raises" (Thomson, 1959). In this regard, rehabilitation medicine is a most suitable technique, if society, trusting in and guided by the profession, will but establish it.

Of ideology it need only be said that ill health undermines rights and assails dignity; that "Our central value is respect for personality . . . based on an understanding that I must imperatively respect in others what I know, from the very nature of my being, must be respected in me" (Gollancz, 1946).

Thus can it be submitted, with clear conviction born of valid argument, that rehabilitation medicine is a *sine qua non* for the control of the "third revolution in medicine", and in the mutually dependent interests of patients and profession alike, surely this is the ultimate goal of public health and social medicine in our time.

Acknowledgements.

If there is much of particular value in this brief paper, it derives largely from the free flow of ideas in which colleagues, senior and contemporary, old and new, have engaged with me, especially my former mentor, Dr. F. H. Krusen and Dr. F. S. Cooksey.

I wish to acknowledge with thanks the permission of the Director-General, Department of Social Services, to publish this paper. The opinions expressed are my own, and do not necessarily reflect those of the Commonwealth

Department of Social Services, or of its Rehabilitation Service.

RODNEY IAN MEYERS.[1]

References.

BRYANT, A. (1940), "English Saga", Fontana Press.

CAMPBELL, I. (1957), "Co-ordination of Rehabilitation Services in Canada", *International Labour Review*, 75 : 1.

CAPENER, N. (1959), "British Orthopædics", *Lancet*, 1 : 951.

CAUGHEY, J. L. (1957), "The Western Reserve Approach to Teaching Medical Students about Chronic Disease", *J. Chron. Dis.*, 6 : 663.

CAUGHEY, J. L. (1959), personal communication.

CURRENT COMMENT (1959), "Adolescent Medicine", MED. J. AUST., 2 : 225.

FOREST, R. DE (1957), "Report of the Committee on Rehabilitation", *J. Amer. med. Ass.*, 164 : 2045

GOLLANCZ, V. (1946), "Our Threatened Values", Cornwall Press.

GORTHY, W. C., DARLING, R. C., TSU PAI, L., and O'BRIEN, J. (1959), "Vocational Evaluation by Work Sample Technic and its Dependence upon Medical Contributions", *Arch. phys. Med.*, 40 : 238.

JONES, R. (1925), "Crippling Due to Fractures. Its Prevention and Treatment", *Brit. med. J.*, 1 : 909.

MEYERS, R. L. (1957), "Aspects of Rehabilitation", MED. J. AUST., 2 : 720.

MEYERS, R. I. (1959), "Medical Rehabilitation—Some Wider Issues", MED. J. AUST., 2 : 554.

STEWART, A. (1959), "Social Medicine Research Methods", MED. J. AUST., 2 : 271.

THOMSON, A. (1959), "The Three Revolutions in Medicine", *Brit. med. J.*, 2 : 130.

VICKERS, G. (1958), "What Sets the Goals of Public Health?", *Lancet*, 1 : 599.

Out of the Past.

DEMONSTRATION OF RÖNTGEN RAY APPARATUS AT SYDNEY HOSPITAL.[2]

[From the *Australasian Medical Gazette*, July 20, 1903.]

AN interesting exposition of the curative powers of the X-rays was given to the Board of Directors of the Sydney Hospital by Dr. Herschell Harris last month. The instrument used has only recently been imported from London, where it was selected by the Secretary of the Röntgen Ray Society. The treatment of a very severe case of rodent tumour was explained, a subject undergoing a prescribed ten minutes' sitting. In this case the patient three months ago first visited the institution. After regular treatment his general health had not only improved, but a cure of the ulcer had been practically brought about. Besides the X-rays, the system of utilizing violet rays (a modification of the Finsen apparatus) was also explained, the means of applying them to the cure of lupus being demonstrated.

Medical Matters in Parliament.

SENATE.

THE following extracts from *Hansard* relate to the proceedings of the Senate.

August 17, 1961.

Pharmaceutical Benefits Scheme.

SENATOR TANGNEY: My question is directed to the Minister representing the Minister for Health. Is it a fact that there is dissatisfaction and concern among pharmaceutical chemists over the working of the pharmaceutical benefits scheme? Does the Minister not consider that a better understanding could be reached if an independent chairman were appointed to the standing committee which discusses certain problems, so that in the event of disagreement between the representatives of the Government and the chemists the chairman could sum up the problem and present his views to the Minister?

SENATOR HENTY: I understand that this proposal, or one along similar lines, has been placed before the Minister for Health and he is considering the matter. When he has reached a decision he will make an announcement.

August 24, 1961.

Pharmaceutical Benefits Scheme.

SENATOR WEDGEWOOD: Can the Minister representing the Minister for Health state whether it is a fact that the estimated expenditure on pharmaceutical benefits for 1961-62 is £34,592,000, an increase of £6,710,778 on the expenditure for the preceding year? Will he furnish to the Senate information showing the number of prescriptions dispensed in 1960-61 under the Commonwealth Health Scheme, the number of persons for whom prescriptions were dispensed, and the average cost of each prescription?

SENATOR HENTY: It is a fact that the increase in this year's Budget for this particular item is more than £6,000,000. I believe that the sum quoted by the honorable senator is correct; I have not got it before me at the moment. If Senator Wedgewood places her question on the notice paper, I shall see that the facts and figures she desires are obtained for her from the Minister for Health.

Salk Vaccine.

SENATOR COOKE: Does the Minister representing the Minister for Health recollect that in March this year I asked him a question in relation to Salk vaccine and a serum for immunization against virus influenza? Does he also recollect that I followed up that question on April 19 when I asked him whether the Commonwealth Serum Laboratories were able to cope with the position and whether vaccine would be available to the States in sufficient quantities when wanted? Does he further recollect that I asked that the matter be treated as one of urgency to ensure that any assistance which was required by the laboratories was given immediately or as early as possible? I ask him whether he remembers that part of his answer was:

> I am confident that he—that is, the Minister for Health—has the problem well in hand, and that he will take steps to ensure that we are not short of vaccine.

I now ask the Minister whether he has observed reports in the Press that of nineteen cases of poliomyelitis reported in New South Wales more than two-thirds had failed to be immunized, and that there have been some deaths, as a result of virus influenza, of juveniles, who had not been immunized. Are statistics in relation to poliomyelitis—such as the number of cases reported and how many persons so stricken had been immunized—available to the Department of Health? Can similar statistics in relation to virus influenza be made available? I should like him, if he would be so good, to inform me of the number of cases reported to the Department of Health, the number given immunization and treatment, and the number of deaths. Will he say also whether a State at any time has asked the Commonwealth Government for vaccine.

SENATOR HENTY: I do not recall the details of Senator Cooke's questions, but I well remember his great interest in this matter and the fact that from time to time he asked me a series of questions to which I have supplied answers. I understand him to say that there had been some deaths because of failure to immunize. I read the Press report of the matter and I do not recall that failure to immunize was due to lack of vaccine. One must bear in mind that there are still members of some sections of the public who fail to have their children immunized, which is more the pity, I think. If the honorable senator will put his questions on the notice-paper I shall endeavour to obtain from the Minister for Health the long list of statistics that he seeks.

August 30, 1961.

Repatriation General Hospital, Springbank.

SENATOR PEARSON (through SENATOR DAME ANNABELLE RANKIN) asked the Minister representing the Minister for Repatriation, upon notice:

1. Did the Minister recently visit the Repatriation General Hospital at Springbank, South Australia?

[1] Senior Medical Officer, Commonwealth Department of Social Services, Sydney; medical authority in the State of New South Wales for the Commonwealth Rehabilitation Service; Honorary Visiting Medical Officer, Rehabilitation Unit, Prince of Wales Hospital (Division of Sydney Hospital), Sydney; Honorary Clinical Assistant in Medicine, The Royal North Shore Hospital, Sydney.

[2] From the original in the Mitchell Library, Sydney.

2. Can he say whether the erection of a new psychiatric ward at this hospital will be included in the forthcoming estimates for works to be carried out during 1961-62?

SENATOR PALTRIDGE: The Minister for Repatriation has supplied the following answers:

1. Yes.

2. Yes. A new ward with complete and up-to-date facilities for treatment of approximately 40 psychiatric in-patients and an out-patient department will be built at the hospital. Planning is well advanced and it is hoped that tenders will be called within the next two or three months.

Shortage of Dentists.

SENATOR MCMANUS asked the Minister representing the Minister for Health, upon notice:

1. Is it a fact, as stated at the recent congress of Australian dentists, that there is a serious shortage of dentists in this country and that the dental health of the community is thereby adversely affected?

2. Is the shortage intensified by regular departures of Australian-trained dentists for Britain due to inducements offered by private firms and the greater rewards available under the national insurance scheme?

3. Are some 500 Australian dentists now practising in Britain, as claimed by the New South Wales Minister for Health, Mr. Sheahan?

4. Does the Commonwealth accept any responsibility for remedying the shortage; if so, what are its plans?

SENATOR HENTY: The Minister for Health has furnished the following replies:

1. I understand that the number of qualified dentists in practice is less than could be desired in some areas of Australia, but is adequate in other areas; no doubt the dental health of some individual members of the community would be better if they received more dental attention.

2. A number of Australian-trained dentists have gone into practice in England, but I cannot say to what extent this has been due to the reasons suggested.

3. I am not aware of the number of Australian dentists practising in England.

4. The Commonwealth is not responsible for any shortage of dentists which may exist in Australia.

September 27, 1961.

Cancer Research.

SENATOR DITTMER: I ask the Minister representing the Prime Minister whether the Government will make a grant to the Queensland Cancer Appeal in the light of the fact that the Queensland Radium Institute serves not only Queensland but also the Northern Territory and Papua and New Guinea. Does the Minister know that many of the patients treated are inhabitants of Commonwealth Territories?

SENATOR SPOONER: I have made some inquiries about this matter. I understand that the Commonwealth has not yet been approached about it. Naturally, if an approach is made the Commonwealth will consider the matter.

Health.

SENATOR BRANSON asked the Minister representing the Minister for Health, upon notice:

1. Is it a fact, as stated in a Press report entitled "Idle Money for Mental Health", that the State of New South Wales has £1,925,000 standing to its credit, which it has been unable to spend on mental health purposes?

2. Is it a fact that the States of Victoria and Tasmania have spent their allocations for these purposes?

3. What moneys, if any, have the States of Queensland, South Australia and Western Australia standing to their credit?

SENATOR PALTRIDGE: The Minister for Health has furnished the following replies:

1. Financial assistance up to an amount of £1,925,000 will be made available by the Commonwealth to the State of New South Wales, subject to the conditions provided in the *States Grants (Mental Institutions) Act*.

2. Yes.

3. Queensland, £900,473; South Australia, £342,340; Western Australia, £559,640.

September 28, 1961.

Lung Cancer.

SENATOR BROWN asked the Minister representing the Minister for Health, upon notice:

1. Did Dr. A. G. S. Cooper, the Director of the Queensland Institute, recently state that there has been a steady increase of lung cancer in Queensland, from 30 cases 20 years ago to 230 cases last year, and did he call for a big increase in research into the problem?

2. What are the names of the bodies which are at present conducting research into this serious situation?

3. In view of the vital national importance of this matter, would it be possible for the Commonwealth Scientific and Industrial Research Organization to set up a section to carry out work of research with a view to reducing the incidence of the disease?

SENATOR HENTY: The Minister for Health has furnished the following replies:

1. I have been informed that Dr. A. G. S. Cooper recently made a statement on lung cancer. However, I am not familiar with the exact text of the statement.

2. The Cancer Registry, which is at present operating in Victoria, has at its main purpose the collection of detailed information on all cases of cancer occurring in that State. This data will form the basis of a further study by statisticians, pathologists and epidemiologists. Investigations into various aspects of cancer are also being made by:

Medical Schools at most Australian Universities, either through the Departments of Surgery or specialists in hæmatology;

Anti-Cancer Councils in the various States;

Australian College of Pathologists;

Department of Mathematical Statistics, University of Sydney.

3. Medical research of this kind is properly the responsibility of medical research bodies such as those mentioned in (2), rather than of the Commonwealth Scientific and Industrial Research Organization.

Correspondence.

FLUORIDATION OF PUBLIC WATER SUPPLIES.

SIR: I feel I should reply to some of the points on fluoridation of public water supplies raised by Dr. Everingham of Rockhampton (MED. J. AUST., October 7, 1961), although I consider that you dealt most adequately with this subject in your recent editorial.

I can claim to have a fair knowledge of the literature on fluoridation and its effects on human beings, and I am quite positive that the consumption of water containing fluorine *in the recommended amounts* is entirely safe. The words in italics are the key to most of the conflicting reports made from time to time concerning toxicity of fluorine and its compounds.

Briefly, Dr. Everingham states that fluoridation risks include increased incidence of mongolism, spondylosis, goitre and hypothyroidism, accumulation in the tissues in "certain nephroses" and "increased radio-active strontium deposition in children". In no instance is the concentration of fluorine stated, while of the three references given, one is easily refuted and the other two are irrelevant as they deal with radiation damage.

It is news to me that water containing up to 1 p.p.m. can increase the incidence of mongolism. The effects of excessive fluorine on the musculo-skeletal system are well-known. Danish cryolyte workers who have a daily intake of 20 to 80 mg. fluorine over 10 to 20 years may develop osteosclerosis, stiffening of the joints and calcification of ligaments. (This is 20 to 60 times the intake of fluorine in fluoridated water.) As to its action on the thyroid, the World Health Organization (1958)[1] stated that "no alteration in thyroid structure or function occurs when daily ingestion levels are less than 50 p.p.m. in the diet". In kidney disease, the Ontario report (1961)[2] states that "there is no evidence

[1] Expert Committee on Water Fluoridation, 1958, First Report, Tech. Rep. Ser. No. 146, Geneva.

[2] "Report of the Committee Appointed to Inquire into and Report upon the Fluoridation of Municipal Water Supplies", 1961, Ontario.

of any irritative effect on the kidney", and the World Health Organization report states that "in terminal nephritis, the patient may succumb to uræmic poisoning and renal failure, but the fluoride retention will never be life endangering". I have no information on nephrosis and fluorides and would appreciate the exact reference.

The alleged combination between strontium-90 and fluorine to form strontium fluoride was raised by Kerwin (1958)[3]. The claim was effectively refuted by Brudesvold (1958)[4] in a later issue of the same journal. Indeed, Brudesvold, a noted authority on fluoridation, commented that "it is unfortunate that Dr. Kerwin has confused the issue of water fluoridation by falsely associating it with the danger of strontium-90 fallout from bomb testing. On issues which so deeply concern public welfare, it is essential that only factual information be considered and that concepts be based on sound principles".

After remarks on radioactivity which are not relevant, Dr. Everingham then claimed that the fluoride content of water cannot be adjusted within 5% of the desired level. If the recommended level were 1 p.p.m., this would mean a difference only of 1 ± 0·05 p.p.m. which is not significant. Because of the large safety factor, a variation of 30% to 40% is permissible.

Alternatives to fluoridation of water have been considered from time to time. Tablets are recommended where fluoridated water is not available. However, they are expensive, they must be given daily, and far too many parents would not purchase or use them. Addition of fluoride to milk has not yet received adequate study, and would not benefit the breast-fed baby.

Unfortunately, the subject of fluoridation arouses in a few the same reaction that met vaccination and chlorination when these were introduced. This results in a flood of misleading and ill-founded statements by opponents with the object of inducing doubt and fear in the mind of the average person, who does not know much about it. The addition of fluoride to water to reduce or prevent dental decay is entirely analogous to the addition of chlorine to water to reduce or prevent intestinal disease. Fluoridation has been intensely studied over the last 20 years, and not even its most vigorous opponent has been able to produce one authenticated instance of harm to human health from the consumption of water with a controlled fluoride content. It will do what it is claimed to do, and it will do no harm. These are the unanimous findings of every authoritative dental and medical organization in the English-speaking world.

If I could presume to advise Dr. Everingham, it would be to make sure of his facts before he makes statements which are not in the public interest. The subject is too important for misinformation to pose as knowledge.

Yours, etc.,

Department of Health and Home Affairs,
Brisbane.
October 12, 1961.

D. W. JOHNSON.

IODINE FOR PRE-OPERATIVE SKIN PREPARATION.

SIR: In reply to the request by Dr. C. C. McKellar in your issue of October 21, I would like to offer my experience in the use of tincture of iodine for skin sterilization. As a general practitioner of whose income approximately half is derived from surgery, I may claim a reasonable experience.

In my early days in surgery it was customary to sterilize skin at the hospital to which I was attached with tincture of iodine, which was not removed after application. Without being able to quote actual figures, one remembers the moderate frequency of occurrence of iodine dermatitis. For the last 15 years, however, it has been my practice to prepare skin surfaces for operation by the application of 1% tincture of iodine which is removed after 30 seconds by *Spiritus Vini Rectificatus* or even *Spiritus Vini Methylatus* swabs. In the whole of that time I have seen no cases of iodine dermatitis, nor have I heard of any from colleagues who have used the same technique. Reviews published from time to time by varying writers strongly support this technique as providing the greatest protection against wound infection.

Yours, etc.,

The Talbot Clinic,
Rockhampton,
Queensland.
October 24, 1961.

C. W. HAMMOND.

[3] *Dent. Digest*, 1958, 64: 58.
[4] *Dent. Digest*, 1958, 64: 324.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Post-Graduate Conference at Bega.

THE Post-Graduate Committee in Medicine in the University of Sydney, in conjunction with the Far South Coast and Tablelands Medical Association, will hold a post-graduate conference in the C.W.A. Rooms, Bega, on Saturday and Sunday, November 11 and 12, 1961. The programme is as follows.

Saturday, November 11: 2 p.m., registration; 2.15 p.m., "Hæmatology, Histopathology and Cytology in General Practice", Dr. P. K. Lamond; 4 p.m., "Common Problems in Dermatology (Drug Eruptions, Infantile Eczema, Tinea of the Feet, Furunculosis and Plantar Warts)", Dr. Richard B. Perkins; 5.30 p.m., film, "Resuscitation of the New-Born".

Sunday, November 12: 9.30 a.m., "Biochemistry and Bacteriology in General Practice", Dr. P. K. Lamond; 10.30 a.m., "Current Advances in Sterility Problems", Dr. Alan Grant; 11.45 a.m., "Do's and Dont's in Dermatitis", Dr. Richard B. Perkins; 2.30 p.m., "Current Advances in Gynæcology", Dr. Alan Grant; 4 p.m., general meeting of the Far South Coast and Tablelands Medical Association.

The fee for attendance at the course is £3 3s., and those wishing to attend are requested to notify Dr. K. J. McCredie, Honorary Secretary, Far South Coast and Tablelands Medical Association, Pambula 7c, as soon as possible. Telephone: Pambula 3

Course for the Primary F.R.A.C.S. and F.F.A.R.A.C.S. Examinations.

A refresher course suitable for candidates proceeding to the primary F.R.A.C.S. and F.F.A.R.A.C.S. examinations to begin in Sydney on September 6, 1962, has been organized in the Departments of Anatomy, Physiology and Pathology of the University of Sydney, in conjunction with the New South Wales State Committee of the Royal Australasian College of Surgeons. The course will be divided into two classes, one of which will be limited to 20 applicants who are prepared to undertake full-time study. The closing date for applications is December 20, 1961.

All applicants will assemble in January to be addressed by selected lecturers and given guidance concerning standard textbooks and reading material in general. A series of weekly tutorials will begin in February and continue until the end of April, when the selection of applicants for the full-time study class will be made. The formal course of daily tutorials and demonstrations will commence towards the end of May. During the interval between the end of the course and the examinations, trial viva-voce examinations will be held. The fee for attendance is 35 guineas.

Applications should be addressed to the Course Secretary, The Post-Graduate Committee in Medicine, Herford House, 188 Oxford Street, Paddington, New South Wales. Telephone: 31-0671.

OVERSEAS VISITORS, NOVEMBER, 1961.

The following overseas visitors will be in New South Wales in November: The Honourable W. S. Maclay, C.B., O.B.E., M.D., F.R.C.P., M.R.C.S., D.T.M. & H., D.P.M., Honorary Physician, Out-patients' Department, Maudsley Hospital, Honorary Physician to Her Majesty the Queen, member of the Royal Medical-Psychiatric Association; Dr. Mary Crosse, pædiatrician, Solihull Hospital, Little Bromwich Hospital, Birmingham, Moseley Hall Children's Hospital, England; J. B. Brown, B.Sc., Ph.D., Medical Research Council Unit of Clinical Endocrinology, University of Edinburgh.

Annual Subscription Course.

The following lectures are open to members of the annual subscription course.

Dr. W. S. Maclay.—Tuesday, November 7, 8 p.m., Central Nursing Training School, Mental Hospital, Gladesville—films on "Continuous Observation" and "Understanding Aggression"; Thursday, November 9, 7 p.m., Broughton Hall Psychiatric Clinic—films on "Continuous Observation" and "Understanding Aggression"; Tuesday, November 14, 3 p.m., Broughton Hall Psychiatric Clinic—"Day Hospitals". Wednesday, November 15, 8 p.m., Broughton Hall Psychiatric Clinic—film and discussion on "Rehabilitation of the Chronic Patient" (arranged in conjunction with the Australasian Association of Psychiatrists); Thursday, November 16, 8 p.m., Stawell Hall, 145 Macquarie Street, Sydney—"Requirements of a Mental Health Service" (arranged in conjunction with the New South Wales Association for Mental Health).

Dr. J. B. Brown.—Monday, November 27, 8 p.m., School of Public Health and Tropical Medicine, University of Sydney—"The Application of Urinary Œstrogen Measurements to Problems in Gynæcology".

Public Health.

AMENDMENTS TO FOOD AND DRUG REGULATIONS IN SOUTH AUSTRALIA.

A NUMBER of important amendments have been made recently to the Food and Drug Regulations in South Australia. The following are the principal matters dealt with:

1. Cleanliness of Food Handlers: Separate and adequate hand-washing facilities are now required for food handlers employed where food for sale is manufactured, prepared or stored. Facilities include clean water, soap, clean towels and a basin connected to a drainage system where water under pressure is available. Hand-washing facilities may not be used for cleaning food or food utensils.

2. Glass-Washing: There are also new provisions for washing glasses. A double-bowl sink has been specified as the minimum required equipment. Provision has been made for washing glasses in cold water provided a suitable detergent-sterilant is used. Clean glasses are required to be provided for each drink except when glasses are refilled in the presence of the customer.

3. Washing of Other Food Utensils: Other food utensils are required to be washed after use in hot water with soap or a detergent-sterilant and finally rinsed in clean running water in the second bowl of the double-bowl sink. Where running water is not available utensils may be finally rinsed in a rinsing bowl of clean water.

4. Machines: Glass-washing and dish-washing machines of a type approved by the Central Board of Health may be used instead of the above utensil-washing facilities and procedure.

5. Uniform Food Standards: These have been prescribed for artificial sweetening substances, edible fats and oils, sugar, glucose and ice creams.

6. Arsenical-Weedkillers: From January 1, 1962, the sale of arsenical weedkillers will be restricted to persons holding a permit to purchase this poison for use in their trade or business. Arsenical weedkillers will not be available then to the home gardener.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE following additions and amendments have been made to the registrar of medical practitioners according to the provisions of the *Medical Practitioners Act*, 1938 (as amended).

Registered medical practitioners who have complied with the requirements of Section 17 (3) and are registered under Section 17 (1) (*a*) of the Act: Cameron, Alan, M.B., B.S., 1954 (Univ. Melbourne); Caro, Anne Jeanette, M.B., B.S., 1954 (Univ. Melbourne), D.C.H., R.C.P. & S. (England), 1959; Frayne, William Robert George, M.B., B.S., 1922 (Univ

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED OCTOBER 14, 1961.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	..	..	..	..	..	1	..	2
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	2	..	2
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	..	..	..	..	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	1(1)	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	7(2)	14(9)	..	..	1	..	4	..	26
Diphtheria	..	..	..	..	1(1)	..	..	..	1
Dysentery (Bacillary)	1	..	..	..	..	1	..	..	2
Encephalitis	..	2(1)	..	..	..	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	154(59)	52(28)	17(9)	28(19)	3(2)	7(2)	2	11	274
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	3	..	..	..	..	..	..	3
Malaria	..	..	..	..	..	..	..	..	..
Meningococcal Infection	1(1)	..	..	..	..	..	..	..	1
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	9(1)	1	..	..	..	..	..	..	10
Puerperal Fever	5(3)	1	..	..	..	..	..	..	6
Rubella	..	32(7)	2	..	6(3)	..	..	..	40
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	6(3)	6(4)	2(2)	2(2)	..	..	..	1	17
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	1(1)	..	..	..	..	1
Trachoma	..	..	..	..	21	..	..	..	21
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	23(15)	7(4)	9(2)	2(2)	6(2)	1(1)	4	..	52
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Melbourne), D.M.R.E. (Cambridge), 1936; Potts, Leo, M.B., B.S., 1956 (Univ. Adelaide); Ricketts, Paul Graham, M.B., B.S., 1961 (Univ. New Zealand).

Registered medical practitioners who have complied with the requirements of Section 17 (3) and are registered under Section 17 (1) (*b*) of the Act: Dalton, John Russell, M.B., B.S., 1955 (Univ. London), F.R.A.C.S., 1960; Handley, Allan Edwin, M.B., B.Ch., 1951 (Univ. Witwatersrand); Johnston, James Bruce, M.B., Ch.B., 1947 (Univ. Aberdeen), Master of Science in Surgery (Minnesota), 1953, F.R.C.S. (Edinburgh), 1954; Lawrence-Owen, John Roger, L.M.S.S.A. (London), 1952; Murnaghan, Gerald Francis, M.B., Ch.B., 1948 (Univ. Edinburgh), F.R.C.S. (Edinburgh), 1954, F.R.C.S. (England), 1956, Ch.M., 1960 (Univ. Edinburgh), M.D., 1961 (Univ. Edinburgh); Seider, Bernice Victoria, M.B., Ch.B., 1953 (Univ. Cape Town); Shapiro, Hugh Jeffrey, M.B., Ch.B., 1958 (Univ. Manchester); Smith, Michael Glynne, M.B., B.S., 1953 (Univ. London); Wood, Philip Robert, M.B., Ch.B., 1958 (Univ. Manchester).

Registered medical practitioner who has complied with the requirements of Section 17 (3) and is registered under Section 17 (2) of the Act: Kohan, Armand Leon, M.D., 1949 (Univ. Bucharest).

Registered medical practitioners who have been issued with a licence under Section 21C (4): Banathy, Laszlo Julius Joseph, for one year from October 6, 1961; Harasymczuk, Isjaslow Leonid Plato, for one year from September 7, 1961; Luedecke, Hans, for one year from September 1, 1961; Tziniolis, John Antony, for one year from October 6, 1961; Sereanu, Andrei, for a period from October 1, 1961 to August 9, 1962.

Registered medical practitioner who has been issued with a licence under Section 21A: Narcowicz, Stefan, for one year from September 19, 1961.

Registered medical practitioner who has been issued with a licence under Section 21C (3) Majewski, Stanislaus, for one year from September 6, 1961.

Registered medical practitioner who has been issued with an interim licence: Kainer, Yaazov, Child Guidance Clinics and Institutions and such of the Mental Hospitals under the control of the Division of Psychiatric Services.

Notes and News.

New W.H.O. Assistant Director-General.

Dr. M. G. Candau, Director-General of the World Health Organization, announces the appointment of Dr. Oganes Vagarshakovich Baroyan (U.S.S.R.) as Assistant Director-General. Dr. Baroyan, born at Erevan, Soviet Armenia, in 1906, comes to Geneva from Moscow, where he directed the Gamaleya Institute of Epidemiology and Microbiology with a staff of 1700. Dr. N. I. Grashchenkov, who occupied this post for two and a half years, has now returned to the U.S.S.R.

World Stamp Issue to Support W.H.O. Malaria Eradication Programme.

Nearly 50 governments have already decided on the simultaneous issue of postage stamps devoted to the world malaria eradication programme launched by the World Health Organization. Many other countries are expected to take part in this project. Dr. M. G. Candau, Director-General of the World Health Organization, states in a letter to governments: "There is every reason to expect that this special postage stamp project, besides making better known the world malaria eradication programme, will develop into a successful international philatelic event, thus resulting in a valuable contribution to the implementation of the programme." The selected date of issue is April 7, 1962, to coincide with World Health Day, 1962.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Benjamin, Bruce Neil Procter, M.B., B.S., 1955. D.L.O., 1961, 16 Valley View Crescent, Greenwich.

Diary for the Month.

NOVEMBER 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
NOVEMBER 9.—New South Wales Branch, B.M.A.: Public Relations Committee.
NOVEMBER 10.—Queensland Branch, B.M.A.: Council Meeting.
NOVEMBER 13.—Victorian Branch, B.M.A.: Finance Sub-Committee.
NOVEMBER 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
NOVEMBER 16.—Victorian Branch, B.M.A.: Executive Meeting of Branch Council.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): Medical Officers to Sydney City Council. All contract practice appointments in New South Wales. Members are requested to consult the Medical Secretary before undertaking practice in dwellings owned by the Housing Commission.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full data in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: 68-2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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